



# International Space Station Malfunctions Checklist

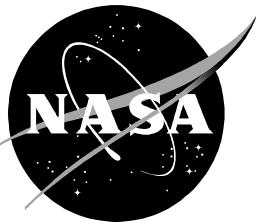
## ISS-2A

**Mission Operations Directorate  
Operations Division**

**Basic  
February 6, 1998**

National Aeronautics and  
Space Administration

**Lyndon B. Johnson Space Center**  
Houston, Texas



**INTERNATIONAL SPACE STATION  
MALFUNCTIONS CHECKLIST  
ISS-2A**

BASIC  
February 6, 1998

APPROVED BY:

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This document is currently under the configuration control of the Systems Operations Data File Control Board (SODFCB).

The preparation for publication of the Basic Edition of the Space Station 2A Malfunctions Checklist required the Controlled Document Processing Area (CDPA) to perform a quality assurance (QC) review of the procedures and establish a centralized, controlled database.

A select task group of CDPA professionals concentrated on bringing the approved procedures into compliance with the Operations Data File (ODF) Standards. After extensive editing and coordination with the procedure developers, the CDPA group delivered an approved copy of each procedure to the 2A SODF Coordinator for review. The 2A Basic Malfunctions Checklist publication is the result of this effort. This brings, for the first time, the fine work of more than 90 procedure developers into one centralized format, consistent with the current requirements of the Operations Data File Standards.

The dedicated CDPA individuals, who made a significant contribution to this publication, are acknowledged for the difficult task of ensuring the success of the 2A Malfunctions Checklist publication.

**ACKNOWLEDGEMENTS**

Editorial Standards Review

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Electronic File Preparation

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## CONTENTS

<u>MALFUNCTION</u> .....	1-1
<u>C&amp;DH</u>	
2A 1553 BUS FAILURE .....	1-5
LOSS OF PCS TELEMETRY .....	1-12
NODE 1 MDM I/O CARD FAILURE PROCEDURE.....	1-15
MDM LOAD IN DIAGNOSTIC STATE (2A-3A).....	1-17
MDM N1-1 DETECTED RT FAIL MDM N1-2 - PMA 1.....	1-19
MDM N1-2 DETECTED RT FAIL MDM N1-1 - PMA 1.....	1-22
PRIME NCS DETECTED RT FAIL MDM FGB-2(1) - FGB .....	1-25
<u>ECLSS</u>	
NODE 1 PRESS.....	1-29
SMOKE DETECTOR MALFUNCTION.....	1-31
NODE 1 CABIN FAN FAILURE.....	1-32
NODE 1 IMV AFT PORT FAN FAILURE.....	1-33
<u>EPS</u>	
FGB RACU 5 POWER LOSS.....	1-37
FGB RACU 6 POWER LOSS.....	1-39
2A RPC TRIP OR POWER LOSS.....	1-41
RPCM LOSS OF COMM.....	1-42
EPS SSR-1 POWER BUS LOSS: RPDA N1RS1 .....	1-45
EPS SSR-1a POWER BUS LOSS: RPCM N1RS1 A .....	1-46
EPS SSR-1b POWER BUS LOSS: RPCM N1RS1 B .....	1-47
EPS SSR-1c POWER BUS LOSS: RPCM N1RS1 C .....	1-48
EPS SSR-2 POWER BUS LOSS: RPDA N1RS2 .....	1-49
EPS SSR-2a POWER BUS LOSS: RPCM N1RS2 A .....	1-50
EPS SSR-2b POWER BUS LOSS: RPCM N1RS2 B .....	1-51
EPS SSR-2c POWER BUS LOSS: RPCM N1RS2 C .....	1-52
EPS SSR-3 POWER BUS LOSS: RPDA N13B.....	1-53
EPS SSR-3a POWER BUS LOSS: RPCM N13B A.....	1-54
EPS SSR-3b POWER BUS LOSS: RPCM N13B B.....	1-55
EPS SSR-3c POWER BUS LOSS: RPCM N13B C.....	1-56
EPS SSR-4 POWER BUS LOSS: RPDA N14B.....	1-57
EPS SSR-4a POWER BUS LOSS: RPCM N14B A.....	1-58
EPS SSR-4b POWER BUS LOSS: RPCM N14B B.....	1-59
EPS SSR-4c POWER BUS LOSS: RPCM N14B C.....	1-60
<u>MECH</u>	
HATCH MECHANISM MALFUNCTION.....	1-63
<u>TCS</u>	
NODE 1 SHELL HEATER FAILURE .....	1-67
PMA 1 SHELL HEATER FAILURE.....	1-77
<u>CORRECTIVE PROCEDURES</u> .....	2-1
<u>A&amp;C</u>	
RACU JUMPER RECONFIGURATION.....	2-5

<u>L&amp;M</u>	
HATCH R&R .....	2-21
RPCM R&R NOD1D1.....	2-25
RPCM R&R NOD1O1 .....	2-29
PRESSURE WALL REPAIR .....	TBD
IMV FAN R&R NODE 1.....	2-34
<u>TCS</u>	
NODE 1/PMA 1 MANUAL HEATER OPERATIONS.....	2-39
<u>QUICK RESPONSE</u> .....	3-1
ISS LEAK.....	3-3
LOAD SHED INITIATE .....	3-10
<u>CUE CARDS</u> .....	4-1
ISS EMERGENCY EGRESS .....	4-3
ISS CONTINGENCY EGRESS.....	4-4
NODE 1 FIRE/SMOKE.....	4-5
FGB FIRE/SMOKE .....	4-6
<u>REFERENCE INFORMATION</u> .....	5-1
NCS C&W EVENT TABLE.....	5-3
N1-1 MDM CHANNEL ASSIGNMENTS.....	5-14
N1-2 MDM CHANNEL ASSIGNMENTS.....	5-21
1553 BUS ASSIGNMENTS - 2A & SUBS.....	5-28
INPUT/OUTPUT CARDS.....	5-29
FLIGHT 2A C&DH OVERVIEW .....	5-30
FGB COMPUTER SYSTEM HARDWARE BLOCK DIAGRAM .....	5-31
POWER CONFIGURATION .....	5-32
LOAD SHED TABLE OVERLAY VERSIONS.....	5-33
2A POWER BUS CONNECTIVITY .....	5-39
NODE 1 INTERNAL LIGHT LOCATIONS.....	5-43
APCU STATUS DISPLAY.....	5-44
SPEC 201 CBM CONTROL DISPLAY.....	5-46
SPEC 202 CBM POWER DISPLAY.....	5-56
SPEC 203 EARLY COMM DISPLAY .....	5-63
SPEC 204 FGB DISPLAY.....	5-66
SPEC 210 NODE 1 DISPLAY .....	5-71
SPEC 212 OIU DISPLAY.....	5-77

MALFUNCTIONC&DH

2A 1553 BUS FAILURE .....	1-5
LOSS OF PCS TELEMETRY .....	1-12
NODE 1 MDM I/O CARD FAILURE PROCEDURE.....	1-15
MDM LOAD IN DIAGNOSTIC STATE (2A-3A).....	1-17
MDM N1-1 DETECTED RT FAIL MDM N1-2 - PMA 1.....	1-19
MDM N1-2 DETECTED RT FAIL MDM N1-1 - PMA 1.....	1-22
PRIME NCS DETECTED RT FAIL MDM FGB-2(1) - FGB .....	1-25

ECLSS

NODE 1 PRESS.....	1-29
SMOKE DETECTOR MALFUNCTION.....	1-31
NODE 1 CABIN FAN FAILURE.....	1-32
NODE 1 IMV AFT PORT FAN FAILURE.....	1-33

EPS

FGB RACU 5 POWER LOSS.....	1-37
FGB RACU 6 POWER LOSS.....	1-39
2A RPC TRIP OR POWER LOSS.....	1-41
RPCM LOSS OF COMM.....	1-42
EPS SSR-1 POWER BUS LOSS: RPDA N1RS1 .....	1-45
EPS SSR-1a POWER BUS LOSS: RPCM N1RS1 A .....	1-46
EPS SSR-1b POWER BUS LOSS: RPCM N1RS1 B .....	1-47
EPS SSR-1c POWER BUS LOSS: RPCM N1RS1 C .....	1-48
EPS SSR-2 POWER BUS LOSS: RPDA N1RS2 .....	1-49
EPS SSR-2a POWER BUS LOSS: RPCM N1RS2 A .....	1-50
EPS SSR-2b POWER BUS LOSS: RPCM N1RS2 B .....	1-51
EPS SSR-2c POWER BUS LOSS: RPCM N1RS2 C .....	1-52
EPS SSR-3 POWER BUS LOSS: RPDA N13B.....	1-53
EPS SSR-3a POWER BUS LOSS: RPCM N13B A.....	1-54
EPS SSR-3b POWER BUS LOSS: RPCM N13B B.....	1-55
EPS SSR-3c POWER BUS LOSS: RPCM N13B C.....	1-56
EPS SSR-4 POWER BUS LOSS: RPDA N14B.....	1-57
EPS SSR-4a POWER BUS LOSS: RPCM N14B A.....	1-58
EPS SSR-4b POWER BUS LOSS: RPCM N14B B.....	1-59
EPS SSR-4c POWER BUS LOSS: RPCM N14B C.....	1-60

MECH

HATCH MECHANISM MALFUNCTION.....	1-63
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TCS

NODE 1 SHELL HEATER FAILURE .....	1-67
PMA 1 SHELL HEATER FAILURE.....	1-77

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## C&DH PROCEDURES

2A 1553 BUS FAILURE .....	1-5
LOSS OF PCS TELEMETRY.....	1-12
NODE 1 MDM I/O CARD FAILURE PROCEDURE.....	1-15
MDM LOAD IN DIAGNOSTIC STATE (2A-3A) .....	1-17
MDM N1-1 DETECTED RT FAIL MDM N1-2 - PMA 1.....	1-19
MDM N1-2 DETECTED RT FAIL MDM N1-1 - PMA 1.....	1-22
PRIME NCS DETECTED RT FAIL MDM FGB-2(1) - FGB.....	1-25

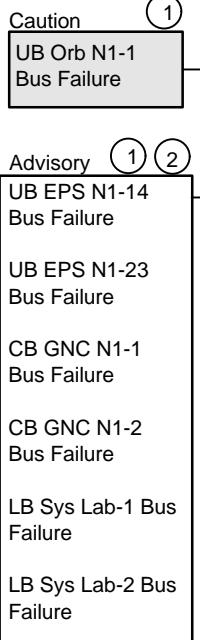
C&DH

C&DH

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**C&DH**

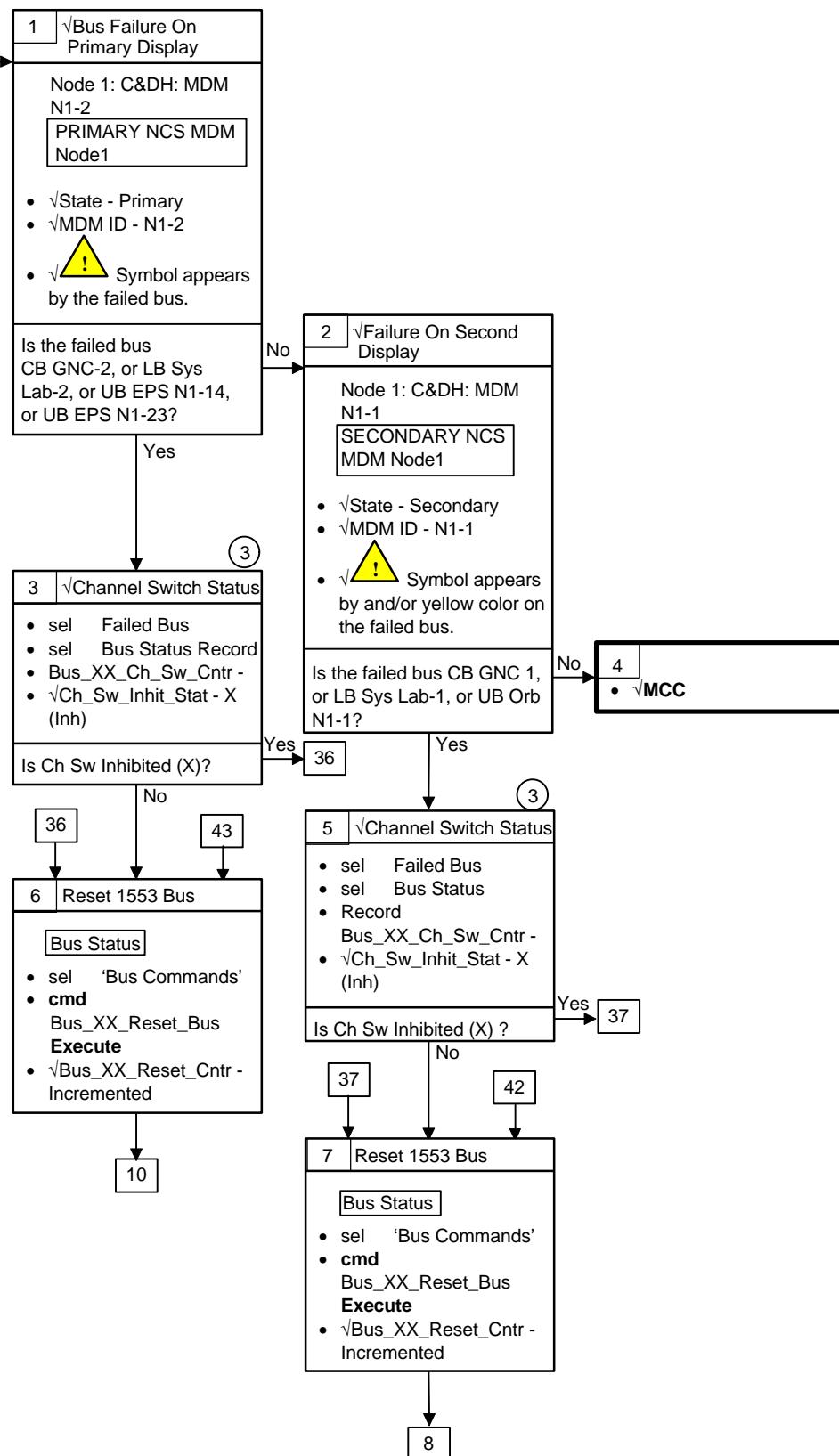
CAUTION ALARM

**Nominal Config:**  
Comm via Early COMM or OIUN1-2 State = Prim  
N1-1 State = Second

Active Tlm Sink = FGB

Auto Retry = Ena

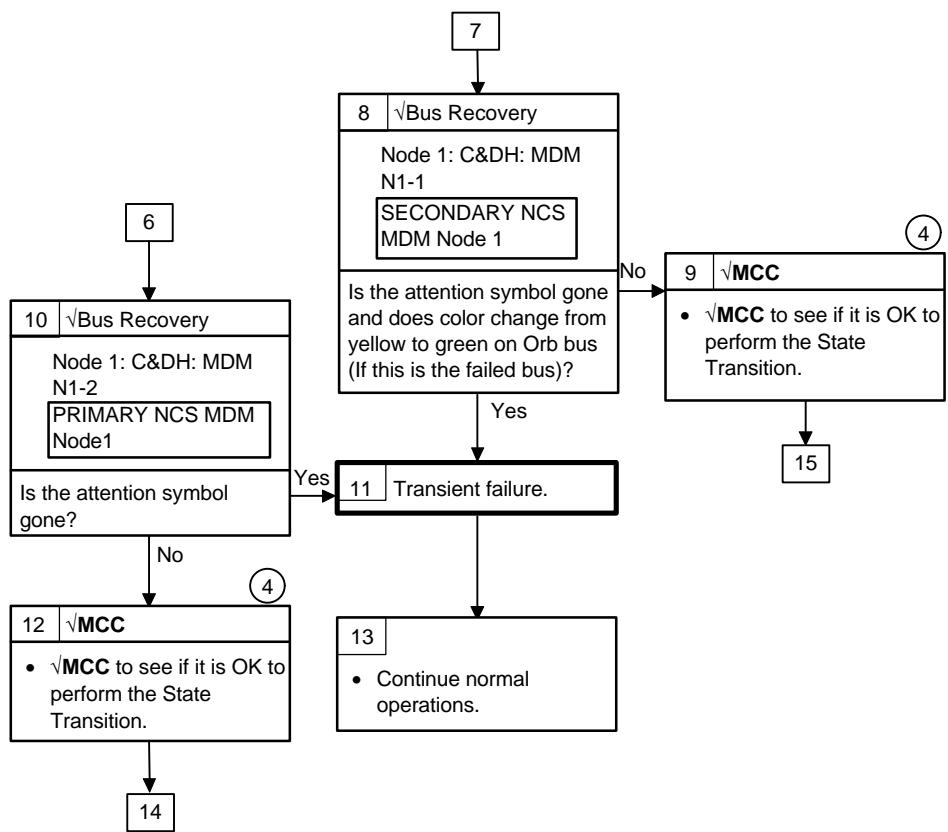
Bus FDIR = Ena

**2A 1553 BUS FAILURE**

(1) UB Orb\_N1-1 is the only bus that generates this caution message. However, this bus only has a few RTs on it: OIU 1 and 2 (not always present), 4 CBMs (usually off), and FGB 1 and 2 (only one is active on the Primary MDM). So, most of the time, there is no I/O on the bus; hence, there is no caution message generated (no bus failure). In addition, there are cases with only one RT on the bus. In these cases, the failure of the RT itself will also cause the bus to fail. Only the caution and warning messages generate the yellow color on the jailed bus.

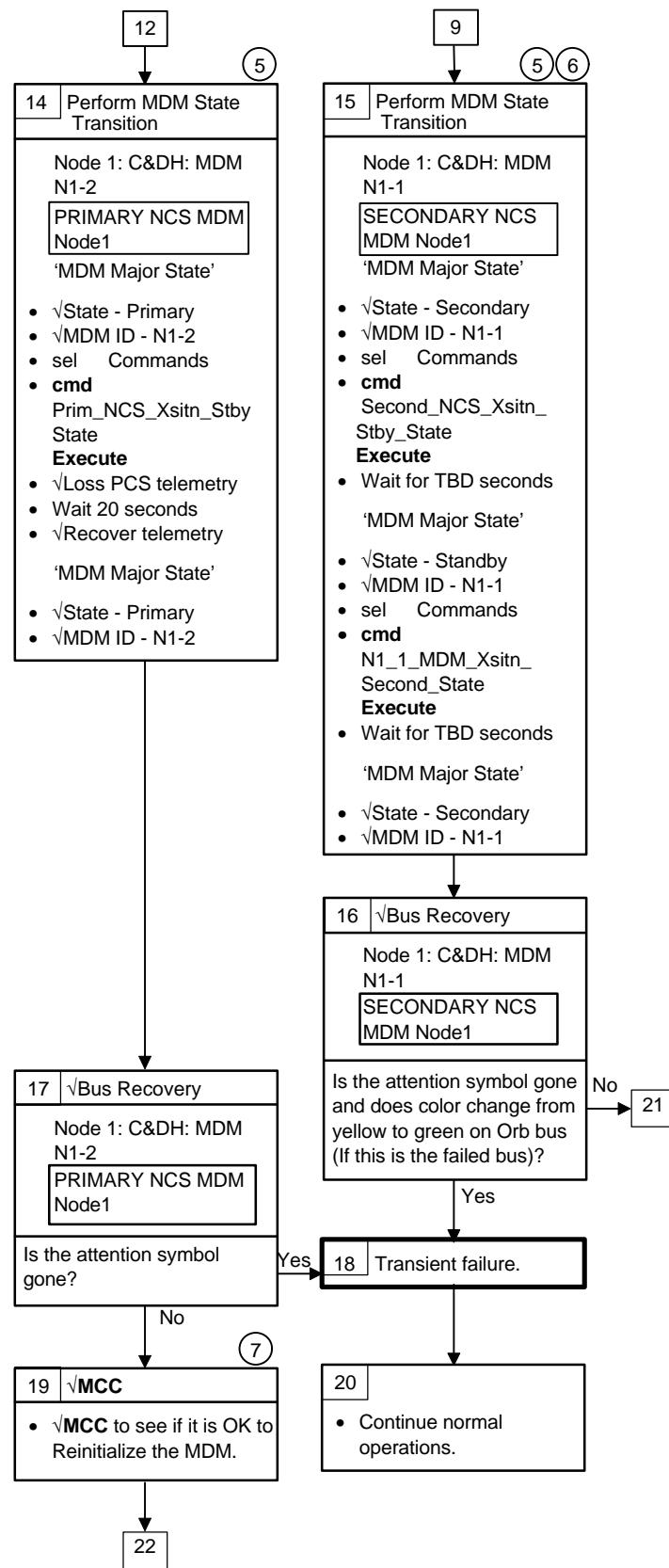
(2) GNC-2 bus has only two RTs on it: N1-1 MDM and a CBM (usually off). GNC-1 only has one CBM (usually off).

(3) "Bus\_XX\_" is the Ops name of the actual failed bus (e.g. CB GNC\_2). The "Bus\_XX\_", nevertheless, has to be one of the buses in the box right above this box (1 or 2).



④ MDM state transition will affect all other space station subsystems connected to that MDM. Make sure that all other disciplines agree with the execution of this step.

## 2A 1553 BUS FAILURE (Cont)



(5)

Transitioning the MDM from one state to another will reset the bus configuration and may fix the failure. The steps in this box are not the same as those in the MDM. Reconfiguration procedure where we put the MDM in new state permanently. The N1-2 MDM will not stay in the new state permanently here. It will go back to Primary state after 20 seconds in standby automatically.

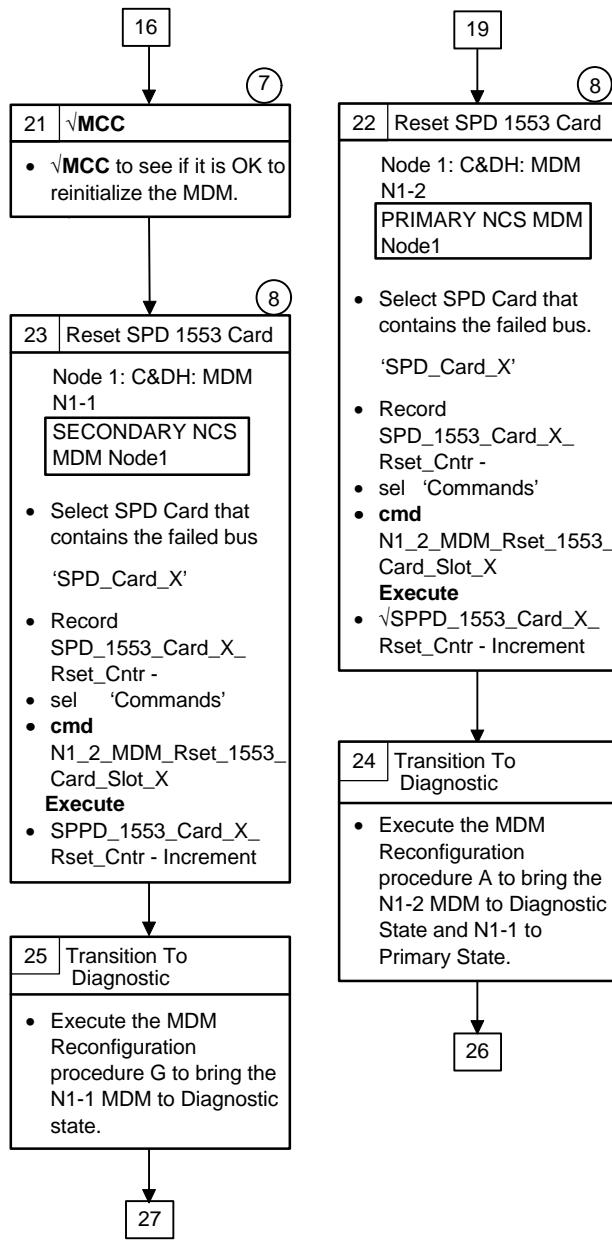
(6)

N1-1 MDM will not go back to Secondary state automatically. It has to be commanded.

(7)

Reinitializing the MDM will affect the operation of the entire MDM which will affect all other subsystems. Make sure that all other disciplines agree with the execution of this step. PCS connected to N1-1 is required.

## 2A 1553 BUS FAILURE (Cont)

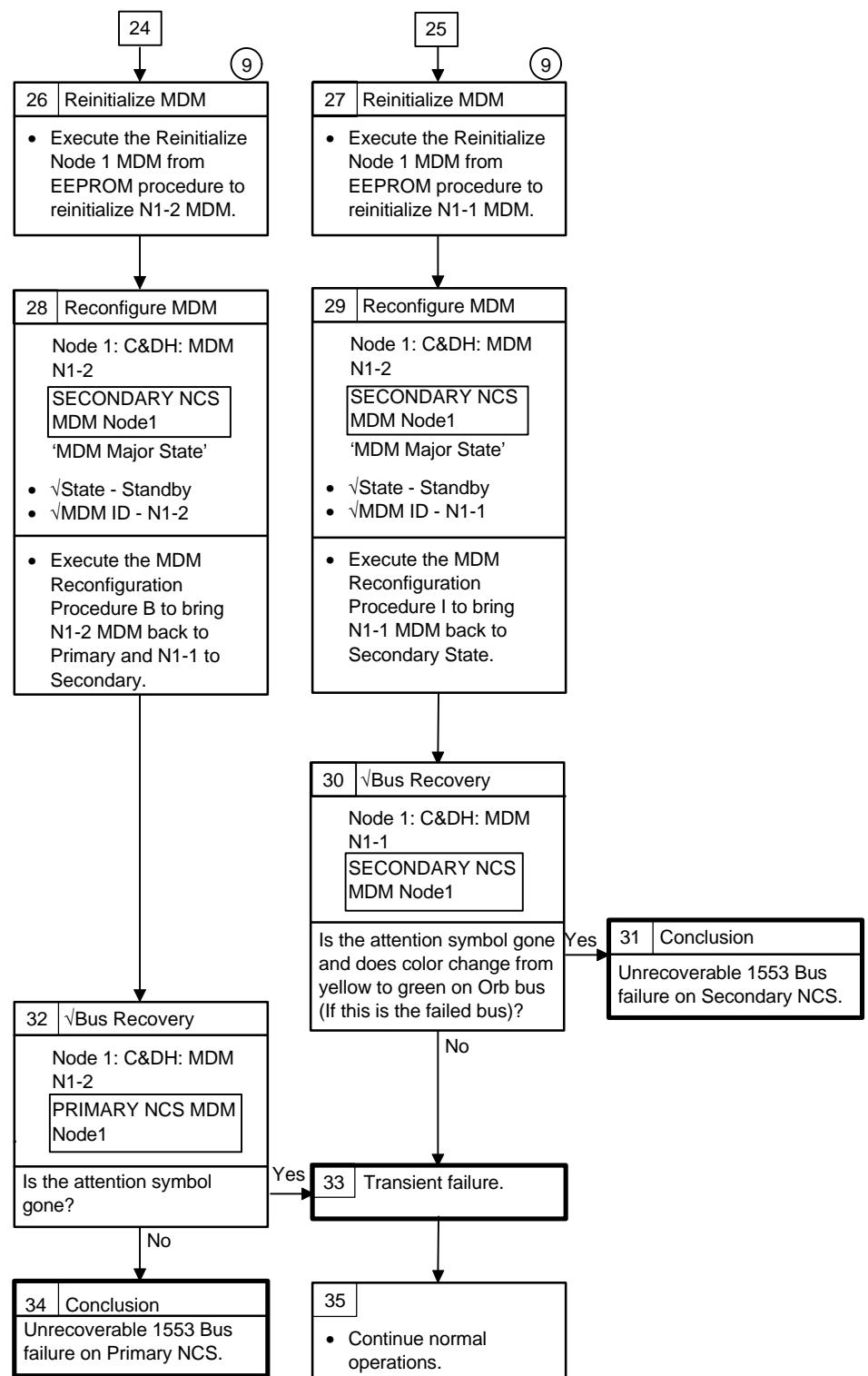


(7) Reinitializing the MDM will affect the operation of the entire MDM which will affect all other subsystems. Make sure that all other disciplines agree with the execution of this step. PCS connected to N1-1 is required.

(8) Resetting the SPD 1553 Card will not reestablish I/O on the buses. So, resetting the SPD Card and reinitializing the MDM is actually one single action in the attempt to recover the bus failure.

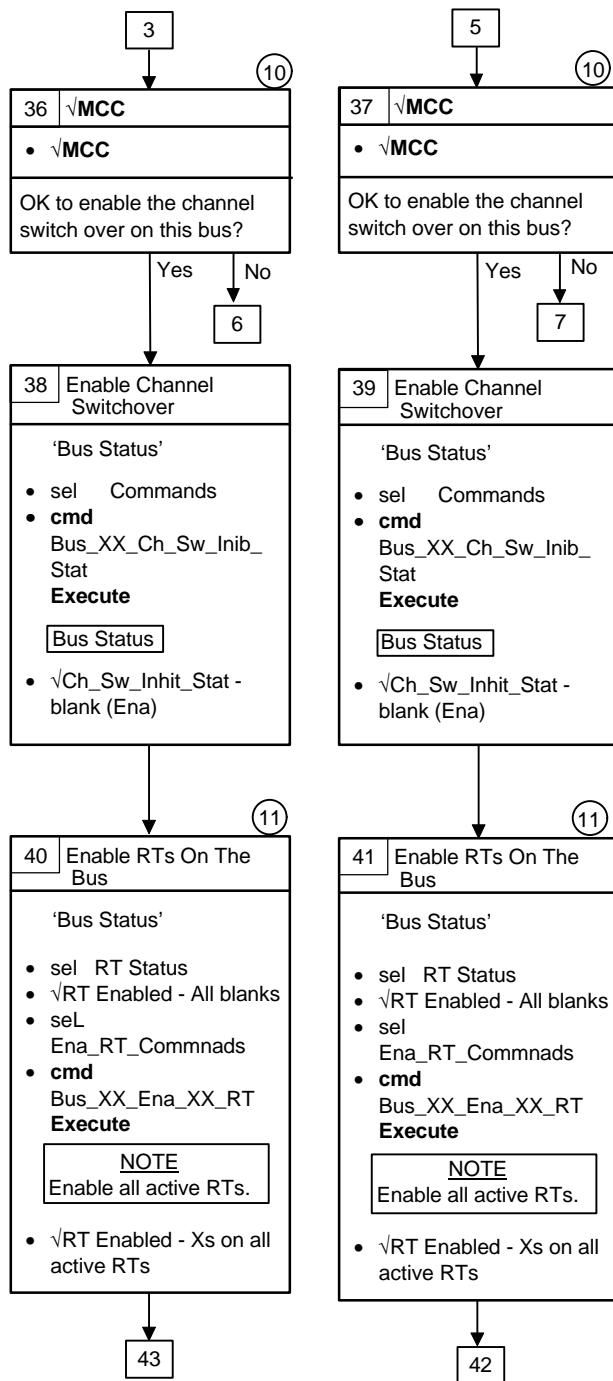
X = 0 for SPD 0.

X = 1 for SPD 1.

**2A 1553 BUS FAILURE (Cont)**

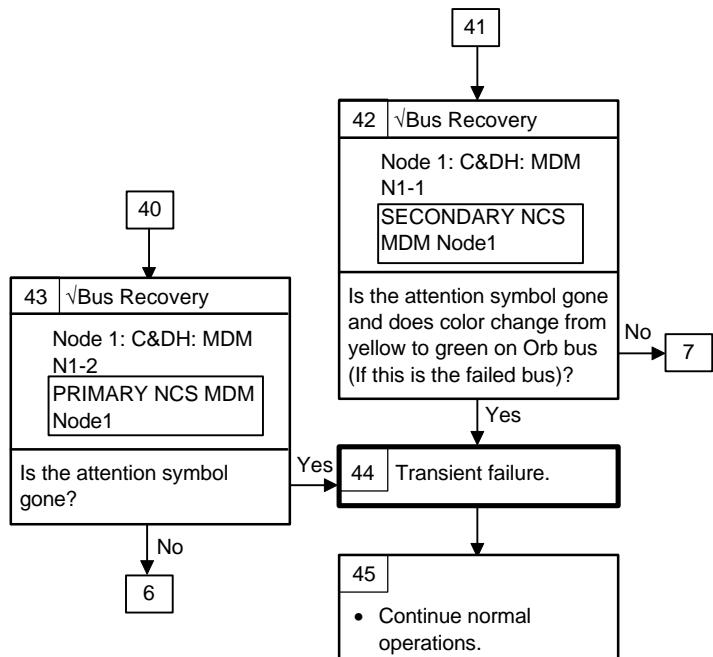
(9)  
Reinitializing the MDM from EEPROM will clear the station old configuration.

## 2A 1553 BUS FAILURE (Cont)



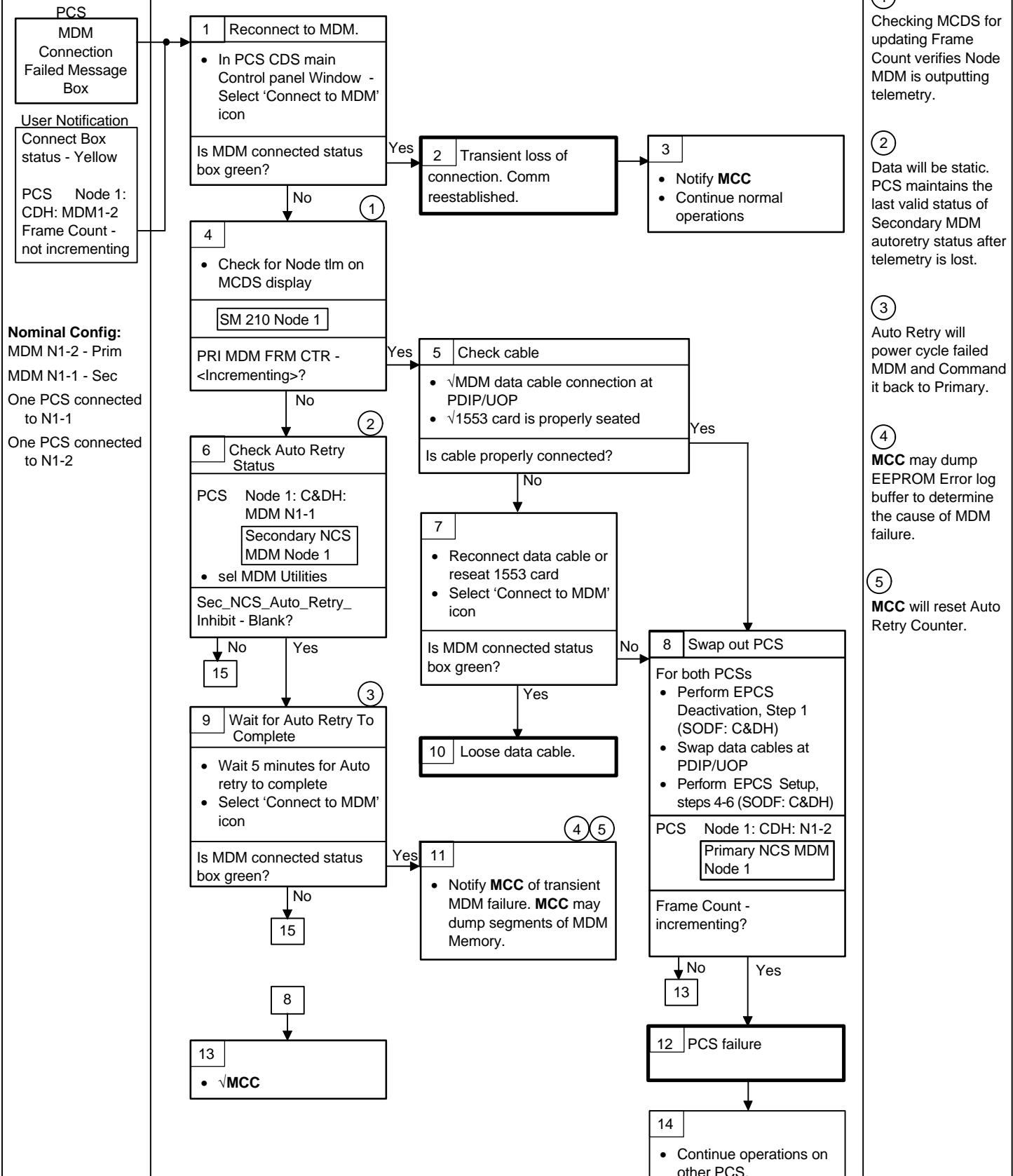
(10) The Auto switchover must have been inhibited for a reason. It is necessary to make sure that there are no critical functions being performed on the other channel that may be hazardous if enabled.

(11) Before the bus is declared fail, every single RT on the bus has to fail. The RTs on the failed bus are disabled prior to setting the bus failure flag bit. The RTs will have to be re-enabled to be able to see if the bus works on the other channel. Use the RT # to RT Ops Names Matrix to enable the active RTs on this bus.

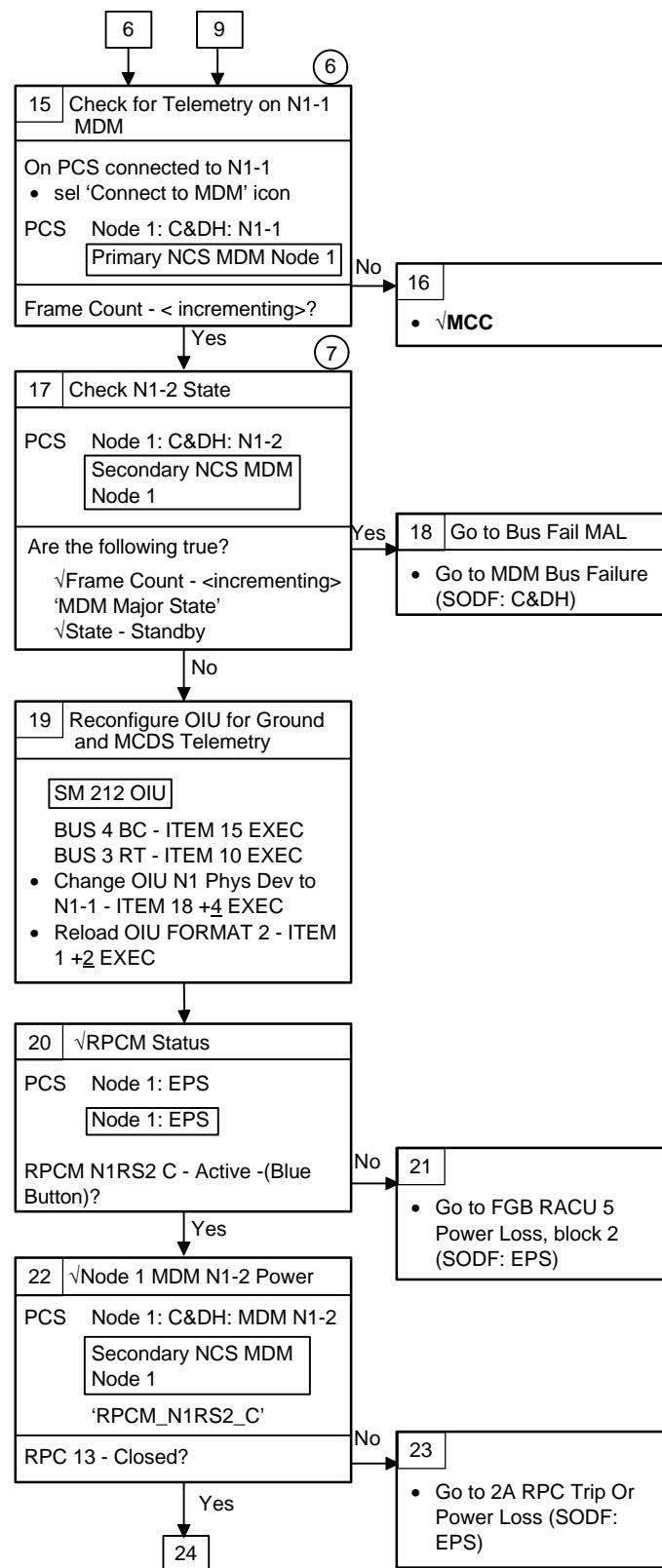
**2A 1553 BUS FAILURE (Cont)**

## C&amp;DH

## LOSS OF PCS TELEMETRY



## LOSS OF PCS TELEMETRY (Cont)



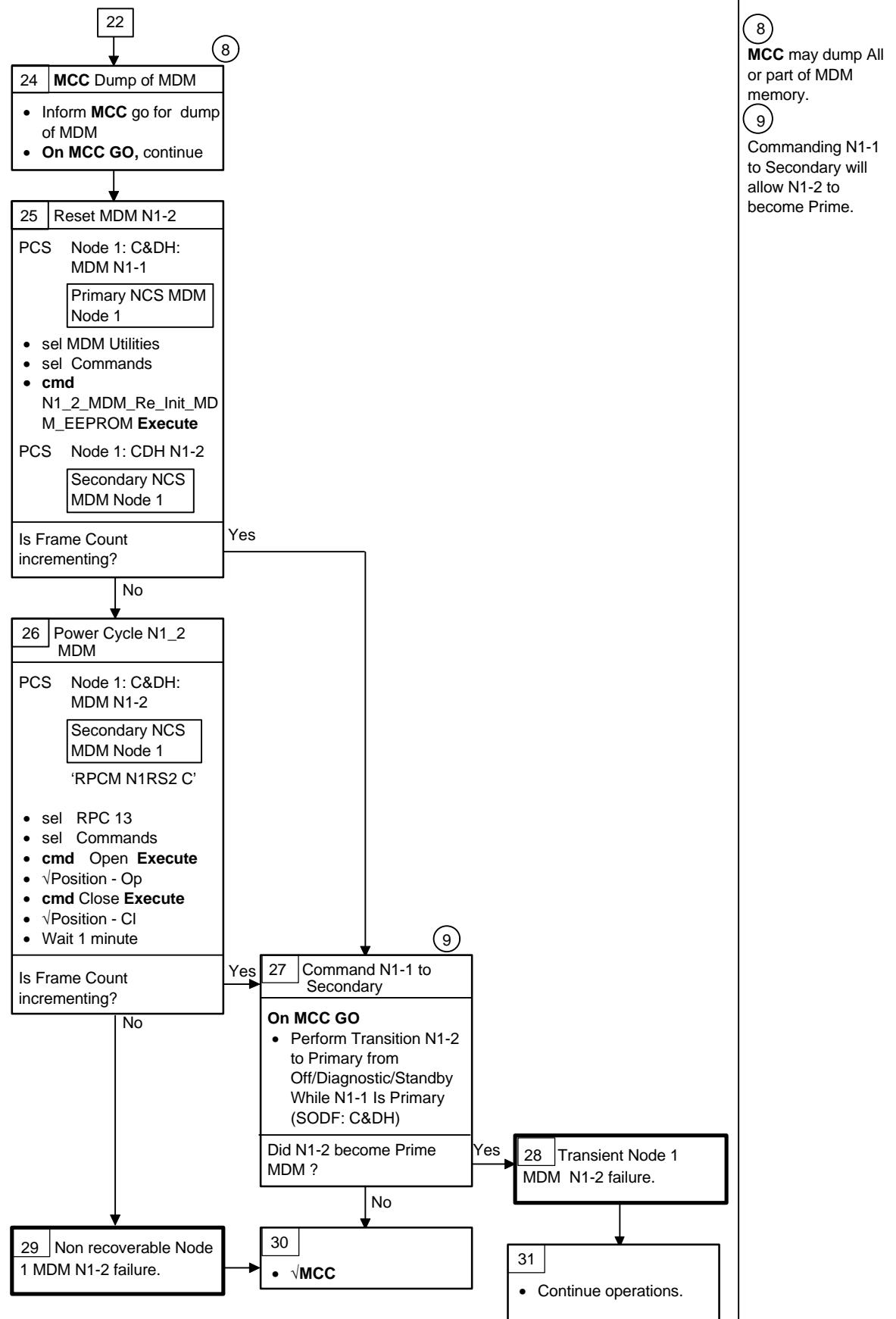
(6)

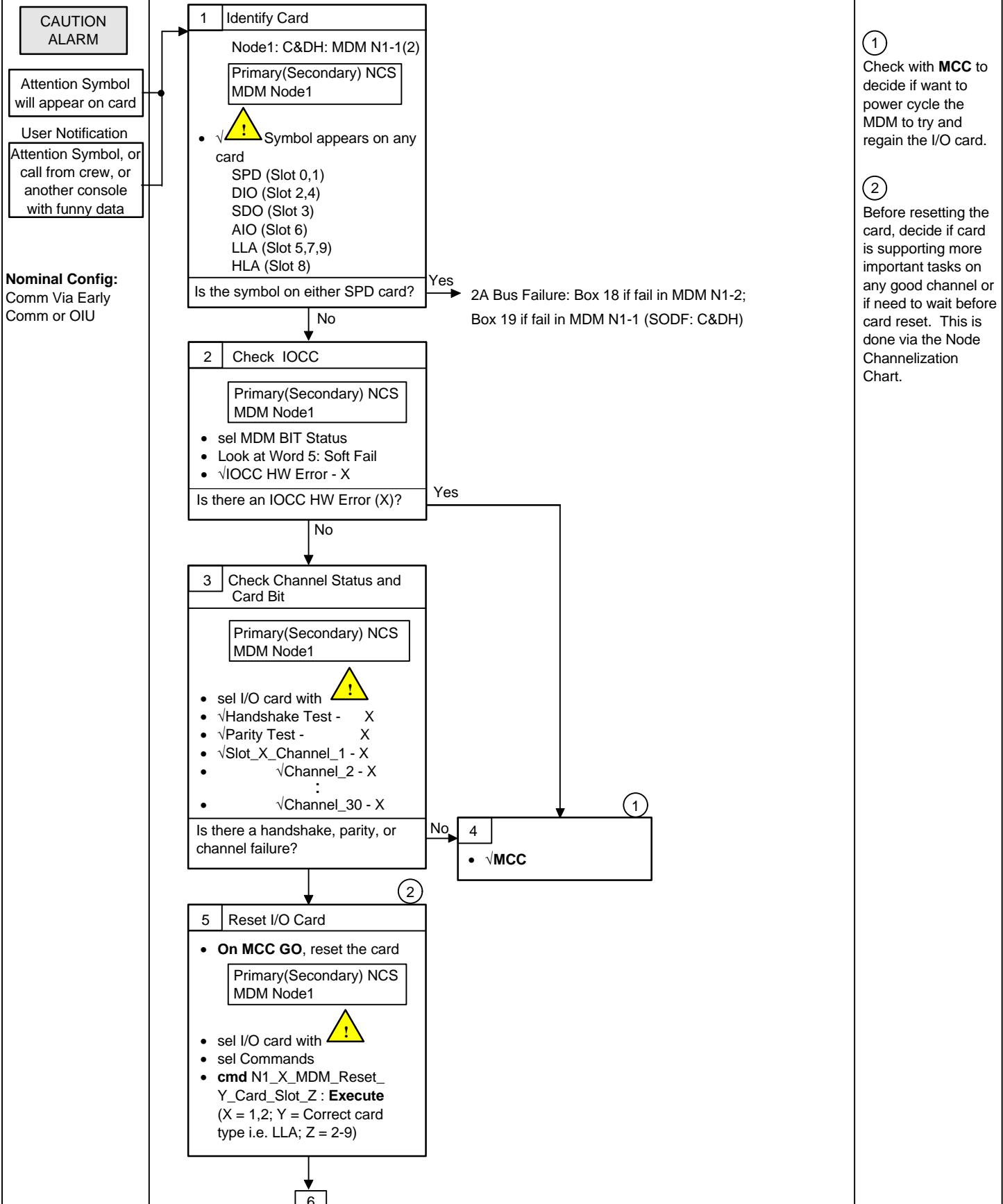
If N-2 has failed, N1-1 will automatically take over as primary.

(7)

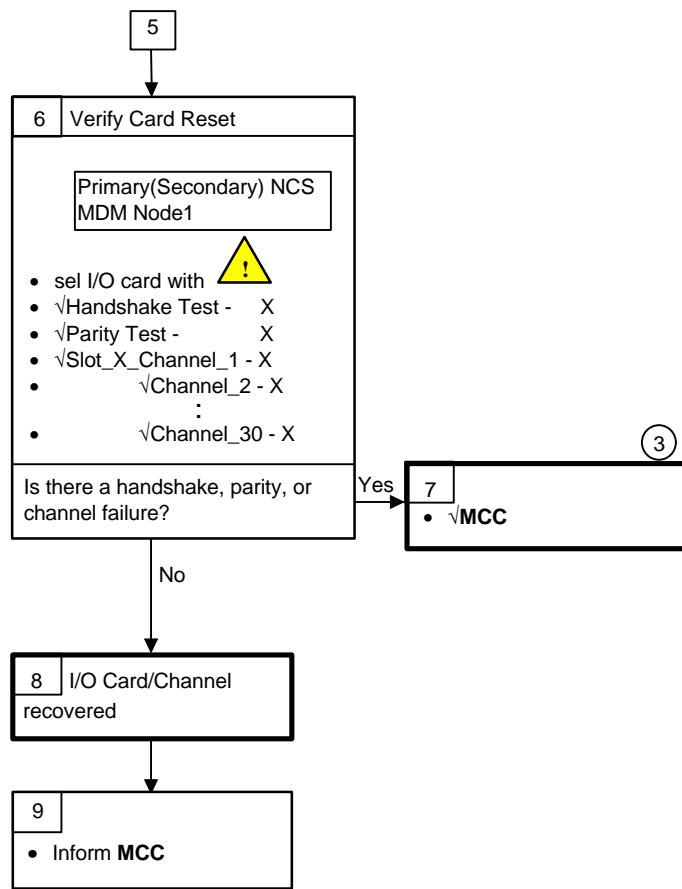
If UB Orb N1-2 Bus fails, N-2 will command itself to standby and wait longer than normal allowing N1-1 to become primary MDM.

## LOSS OF PCS TELEMETRY (Cont)



**C&DH****NODE 1 MDM I/O CARD FAILURE PROCEDURE**

## NODE 1 MDM I/O CARD FAILURE PROCEDURE (Cont)



(3)  
Check with **MCC** to decide if want to power cycle the MDM to try and regain the I/O card.

## MDM LOAD IN DIAGNOSTIC STATE (2A-3A)

### 1. PERFORM PRE-LOAD SANITY CHECK WITH MEMORY MAP AND FILE TO BE LOADED

**FMT:LOAD:INITIATOR**

If S/W Load

- ✓SW\_Load\_XX\_EEPROM\_XX - (SW Load Version ID i.e. Rev 2)
- ✓Memory Location - EEPROM
- ✓SW\_Load\_EEPROM\_Start\_Addr - compatible with Memory Map
- ✓SW\_Load\_XX\_Wd\_Count - compatible with Memory Map

If ADT Load

#### NOTE

Separate files are required for Loads to non-contiguous memory areas, and also for DRAM and EEPROM Loads.

- ✓Memory Location - EEPROM
- ✓ADPXX\_EEPROM\_Start\_Addr - compatible with Memory Map
- ✓ADPXX\_Wd\_Count - compatible with Memory Map
- ✓ADPXX\_Ver\_Id -
- ✓ADPXX\_Cksum -
- ✓Destination\_Device - MDMXX

### 2. CONFIGURE FOR COMMAND UPLINK

**TELCOM: TBD**

If N1-2 is Primary (N1-1 is in Diagnostics)

- ✓Command\_Path-Orbiter/Early Comm
- If uplink path = orbiter (Normal OIU configuration)
- ✓OIU\_Routing\_Code -

Send Enable RT Device command to enable N1-1 MDM

- ✓N1-1 = Enable RT
- Send Disable NCS Auto Retry on N1-1
- ✓N1-2 Auto Retry on N1-1 = Disable

If N1-1 is Primary (N1-2 is in Diagnostics)

- ✓Command\_Path-Orbiter/Early Comm
- If uplink path = orbiter
- Reconfigure the OIU to RT on Bus 3, BC on Bus 4, and Format 002.
- ✓OIU\_Routing\_Code -

Send Enable RT Device command to enable N1-2 MDM

- ✓N1-2 = Enable RT
- Send Disable NCS Auto Retry on N1-2
- ✓N1-1 Auto Retry on N1-2 = Disable

If both MDMs are in Diagnostics (orbiter must present)  
Uplink Path = OIU  
Reconfigure the OIU to make bus 3/4 BC to the MDM being loaded  
and use format 002.  
√OIU\_Routing\_Code -

3. SEND LOAD FILE

FMT:LOAD:INITIATOR

If SW Load  
cmd\_SW\_Load\_XX\_Version XX\_Uplink (TBD)

If ADT Load  
cmd\_ADG\_Load\_XX\_Uplink (TBD)

NOTE

Send all load cmd files.  
Multiple ADP files may be required.

cmd\_SW\_PT#\_Uplink (TBD)  
cmd\_ADG\_XX\_cksum \_Uplink (TBD)

4. VERIFY COMPLETION OF LOAD

FMT:LOAD:INITIATOR

√FMT\_Load\_Status - 100% complete

5. REINITIALIZE EEPROM

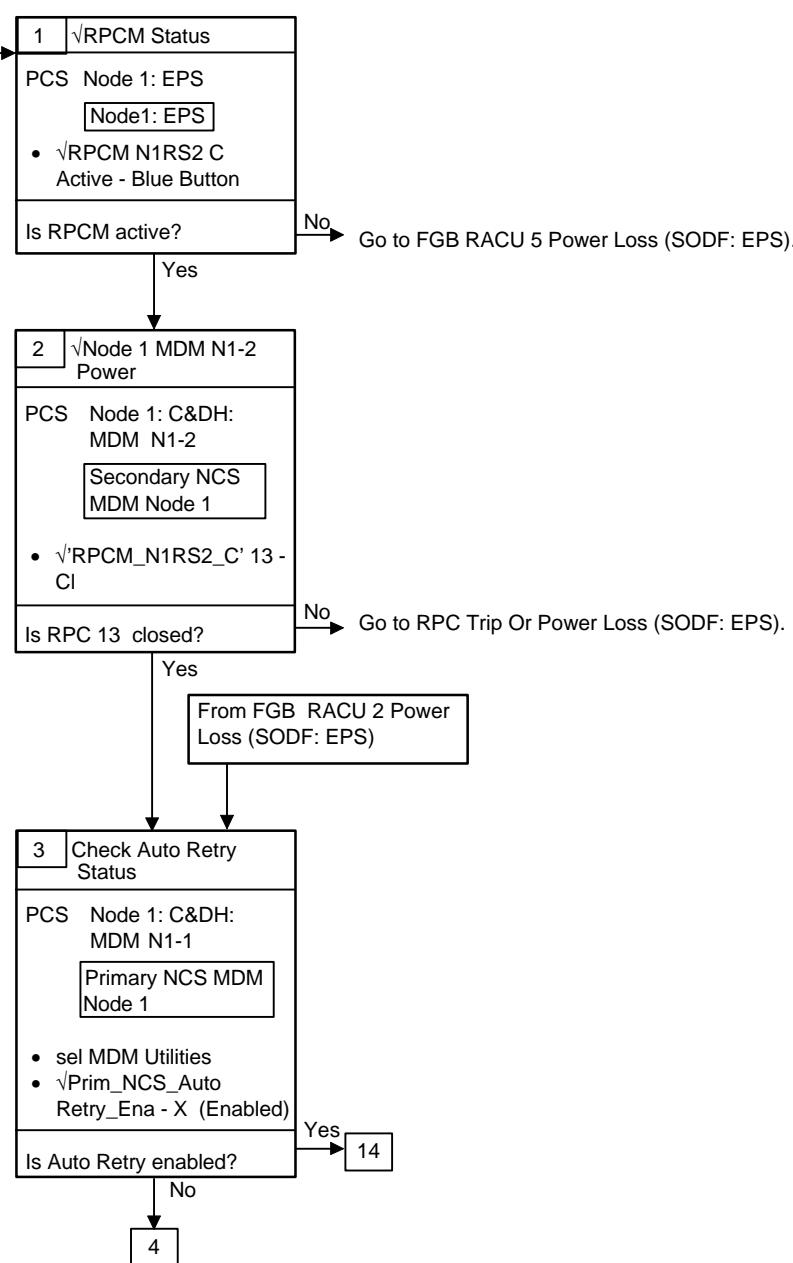
Perform SODF: REINITIALIZE NODE 1 MDMs procedure

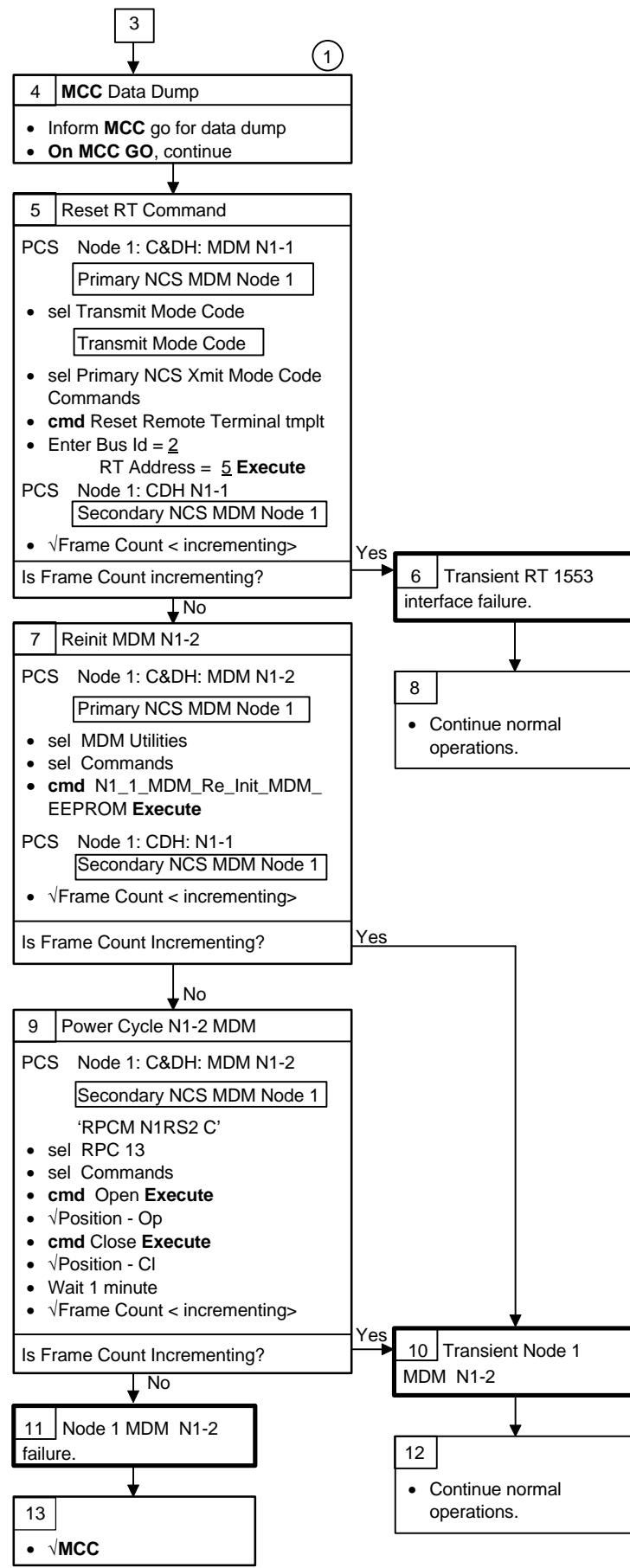
**C&DH****MDM N1-1 DETECTED RT FAIL MDM N1-2 - PMA 1**

**CAUTION ALARM**

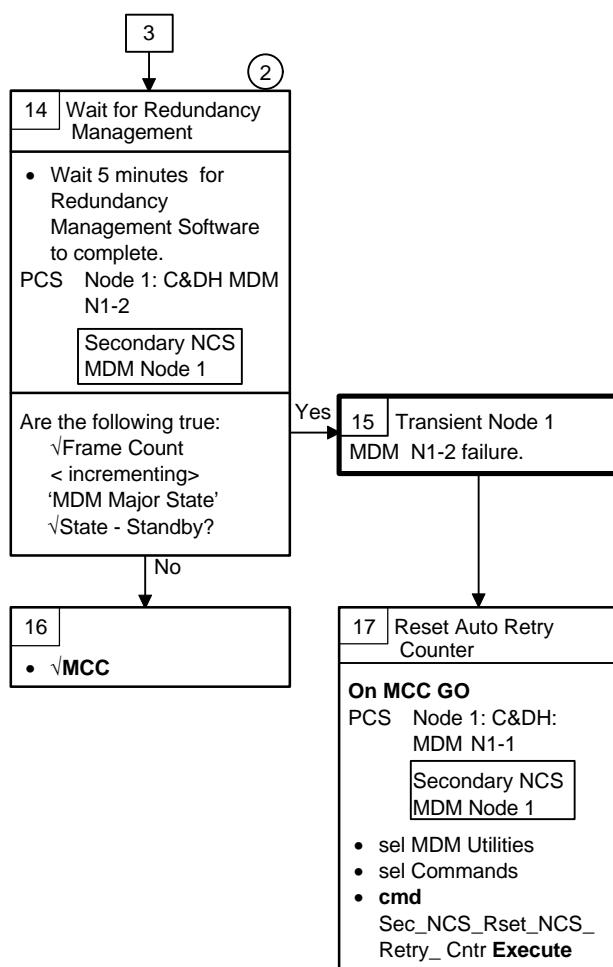
MDM N1-1  
Detected RT Fail  
MDM N1-2 -  
PMA 1

**Nominal Config:**  
N1-2 Secondary  
N1-1 Primary



**MDM N1-1 DETECTED RT FAIL MDM N1-2 - PMA 1 (Cont)**

C&amp;DH

**MDM N1-1 DETECTED RT FAIL MDM N1-2 - PMA 1 (Cont)**

(2)  
Auto Retry will power cycle MDM N1-2.

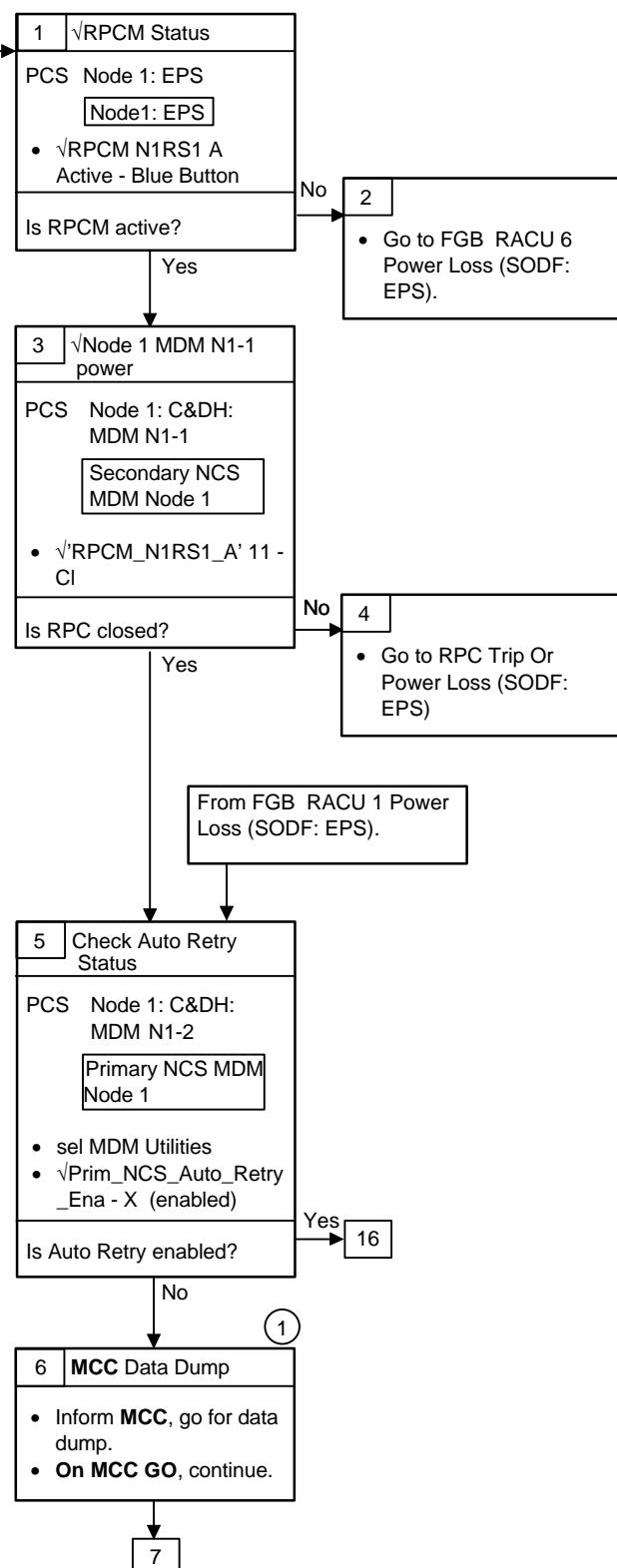
**C&DH****MDM N1-2 DETECTED RT FAIL MDM N1-1 - PMA 1**

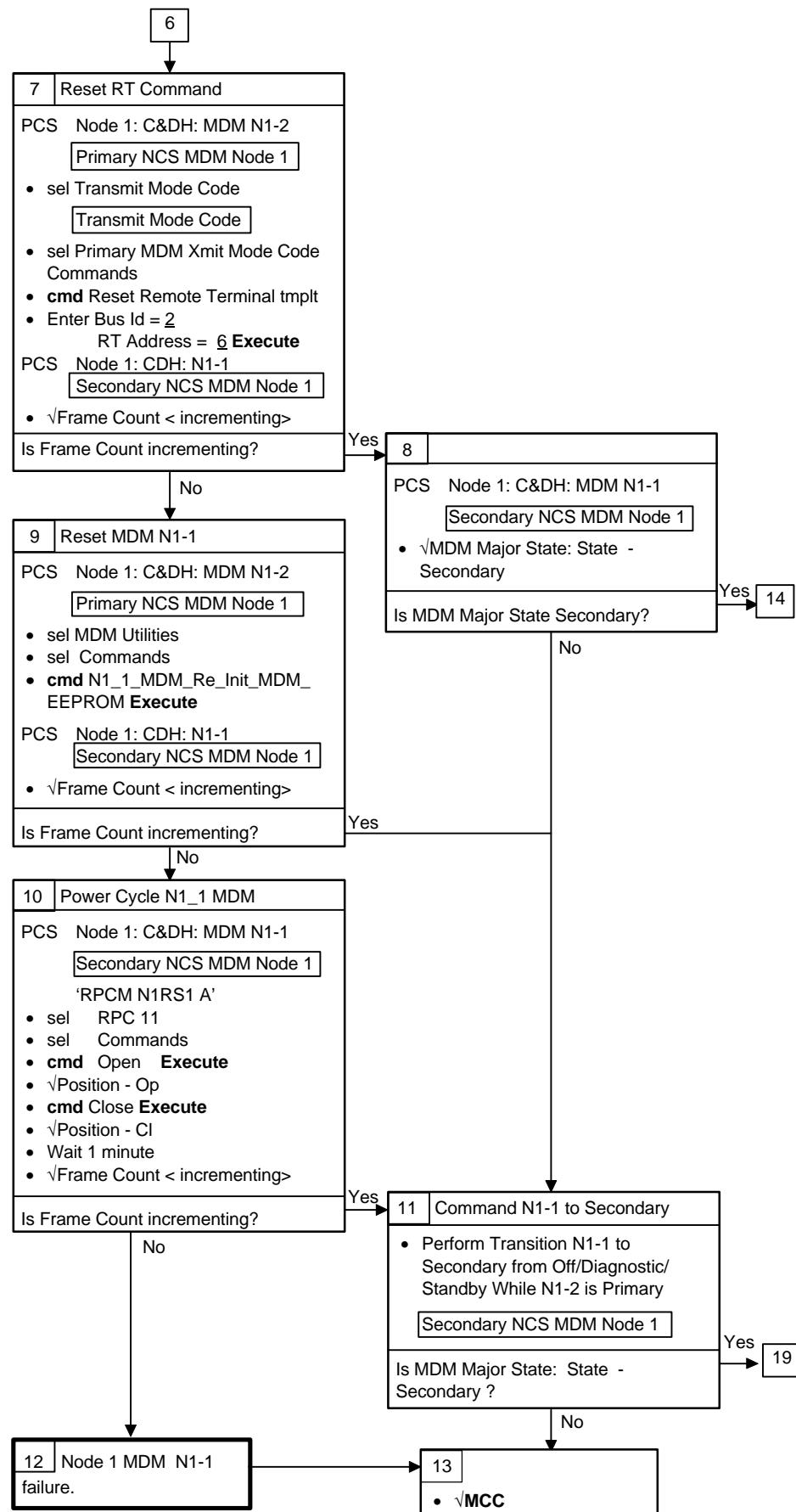
CAUTION  
ALARM

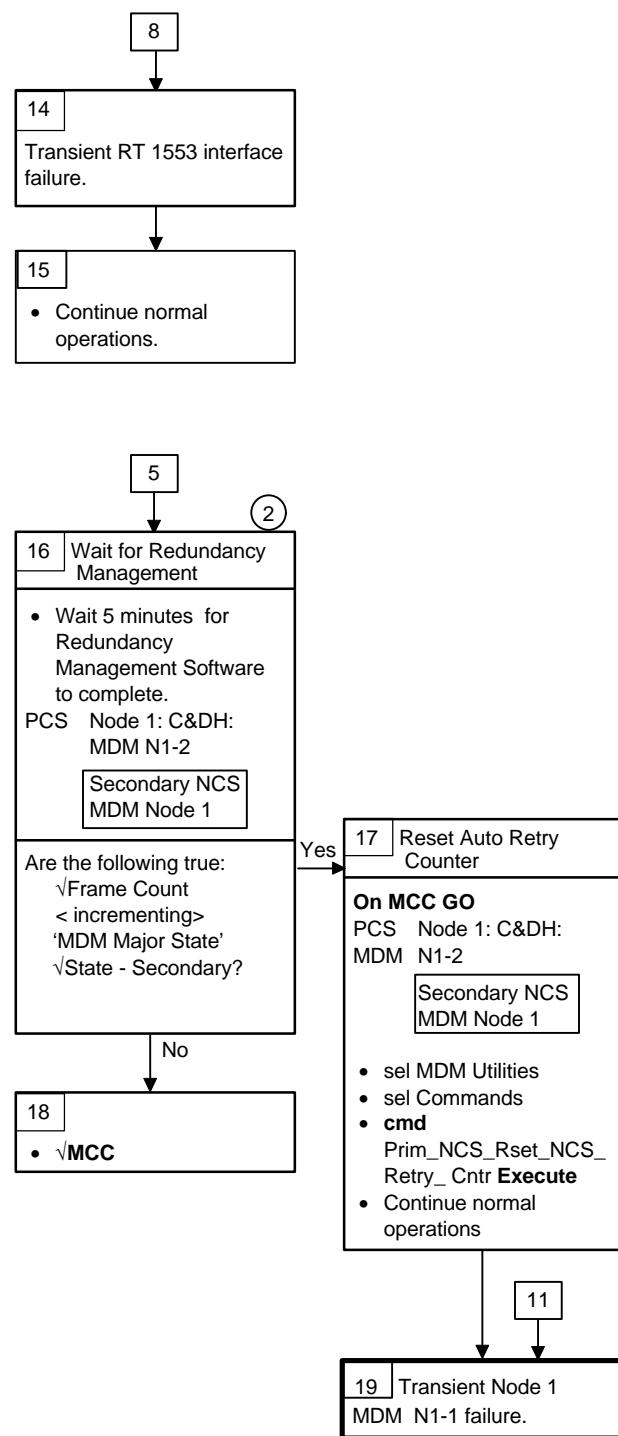
MDM N1-2  
Detected RT Fail  
MDM N1-1 -  
PMA 1

**Nominal Config:**  
N1-2 Primary  
N1-1 Secondary

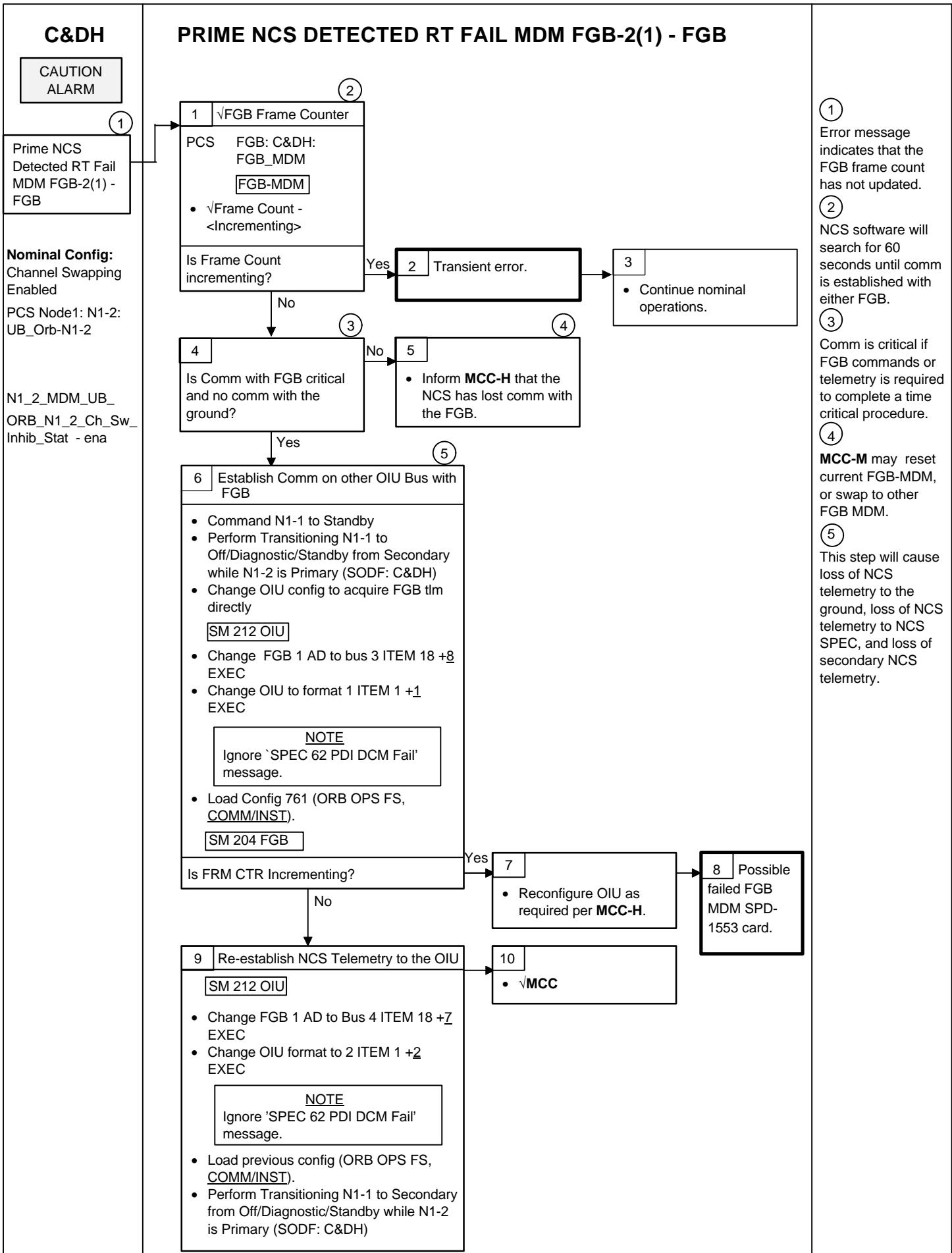
(1)  
**MCC** may dump all  
or part of MDM  
Memory to  
determine source of  
the failure.



**MDM N1-2 DETECTED RT FAIL MDM N1-1 - PMA 1 (Cont)**



(2)  
Auto Retry will power cycle MDM N1-1 and command it to secondary.



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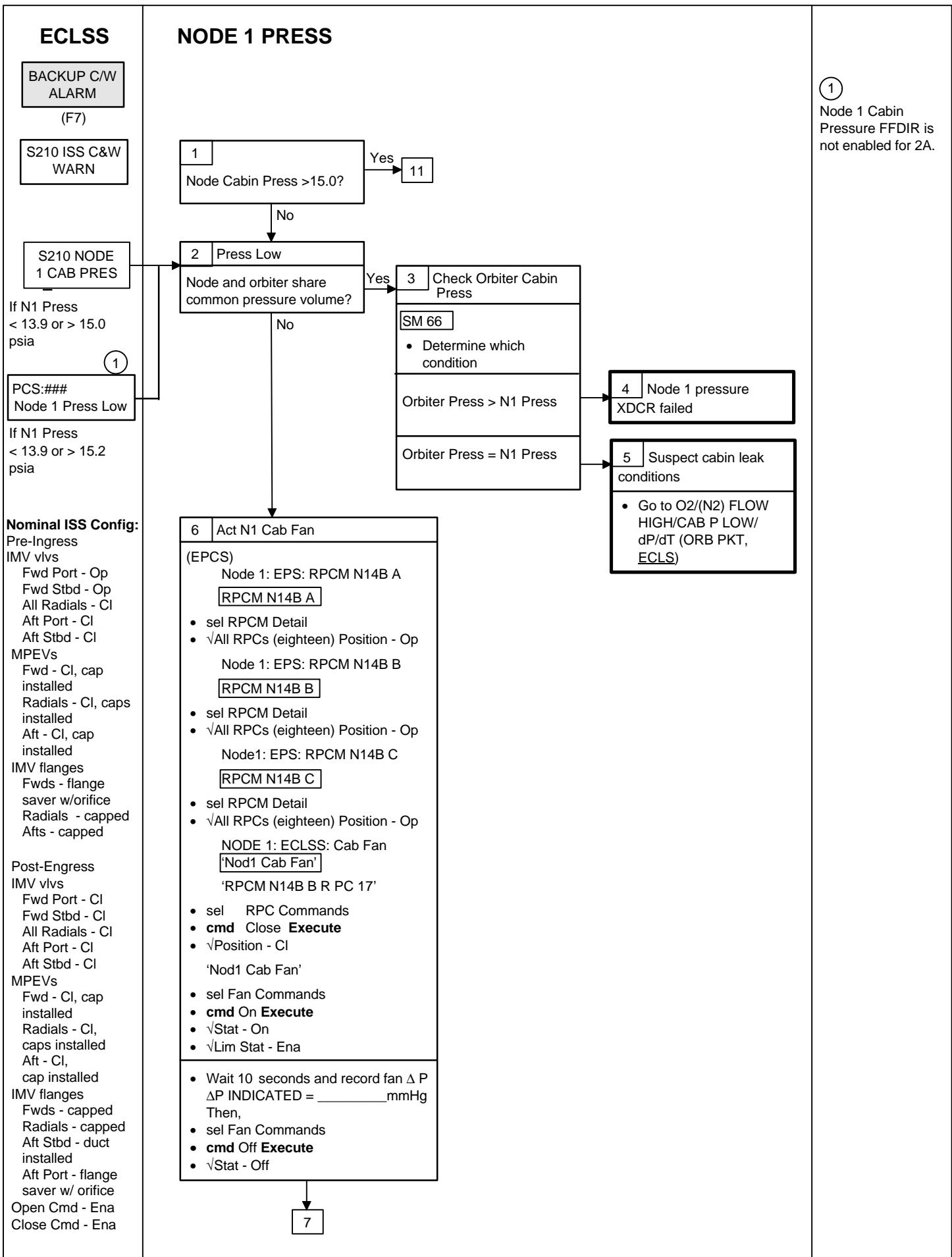
## ECLSS PROCEDURES

NODE 1 PRESS .....	1-29
SMOKE DETECTOR MALFUNCTION.....	1-31
NODE 1 CABIN FAN FAILURE.....	1-32
NODE 1 IMV AFT PORT FAN FAILURE.....	1-33

ECLSS

**ECLSS**

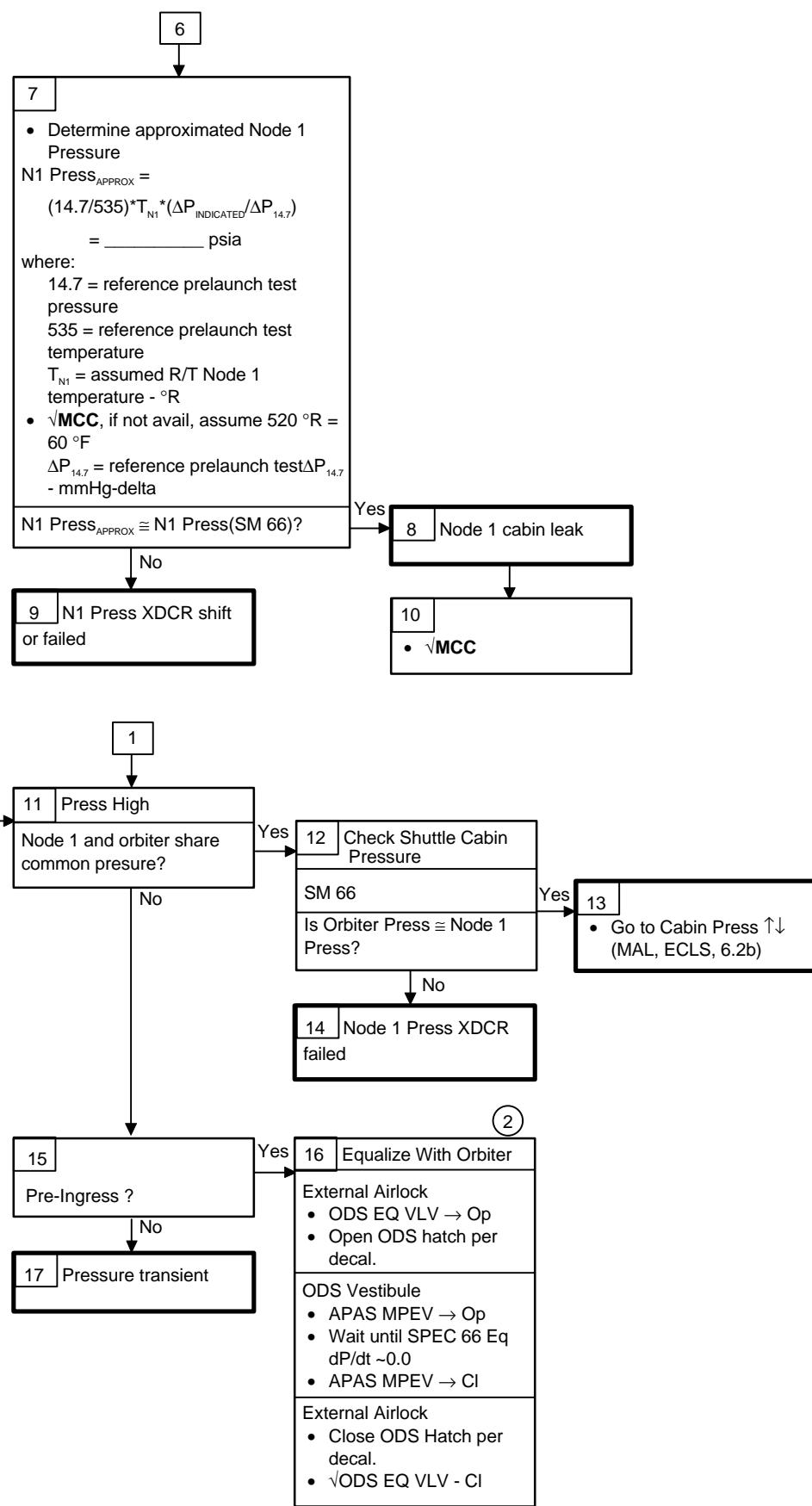
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## NODE 1 PRESS (Cont)

(2)  
Over-Press  
condition of N1  
requires equalization  
of N1 with orbiter.

BACKUP C/W ALARM  
(F7)  
S210 ISS C/W WARN  
  
S210 NODE 1 CAB PRES  
  
If Node 1 press < 13.9 or > 15.0  
  
PCS:###  
Node 1 Press High  
  
If Node 1 press < 13.9 or > 15.20



**ECLSS**

Class III  
Caution

Smoke Detector 1(2)  
Activ BIT Fail - NOD1  
Smoke Detector 1(2) Lens  
Contamination - NOD1  
Smoke Detector 1(2) Fail - NOD1

(EPCS)

SM Alert

210 ISS C&amp;W CAUT

**Nominal Config:**

Nod1 SD 1(2) Act

BIT Failed -

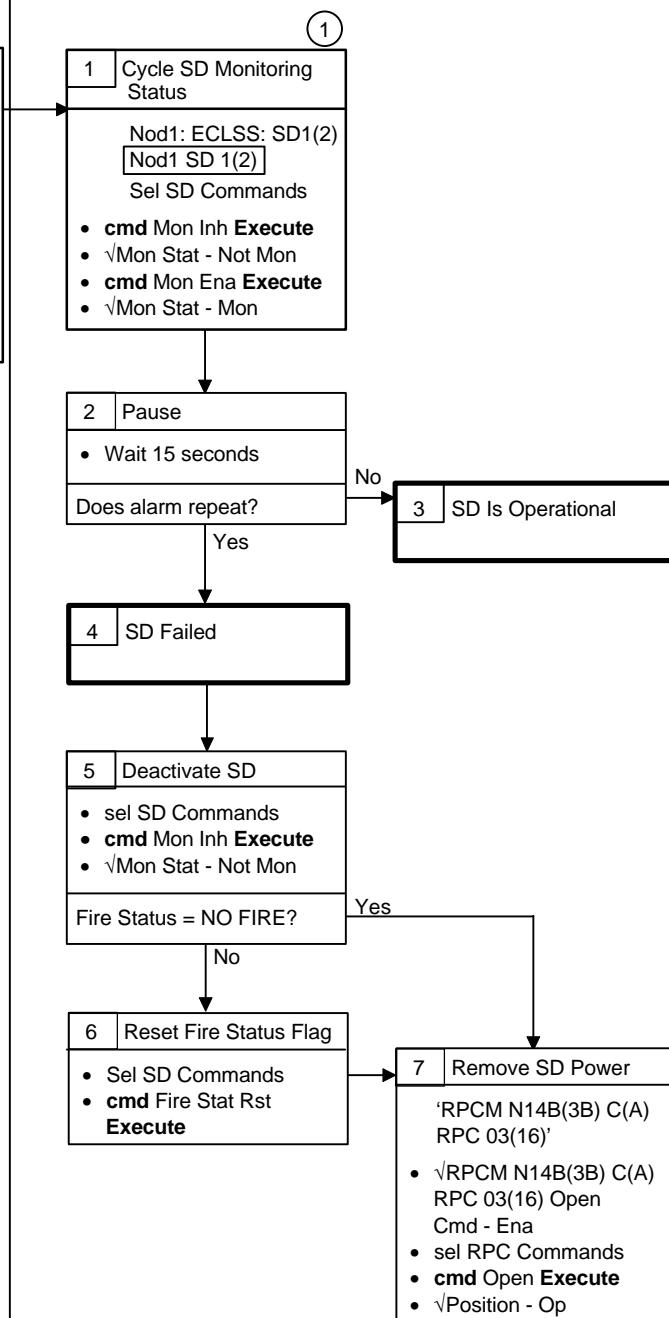
Operational

Nod1 SD 1(2)

Lens C ontam - Clean

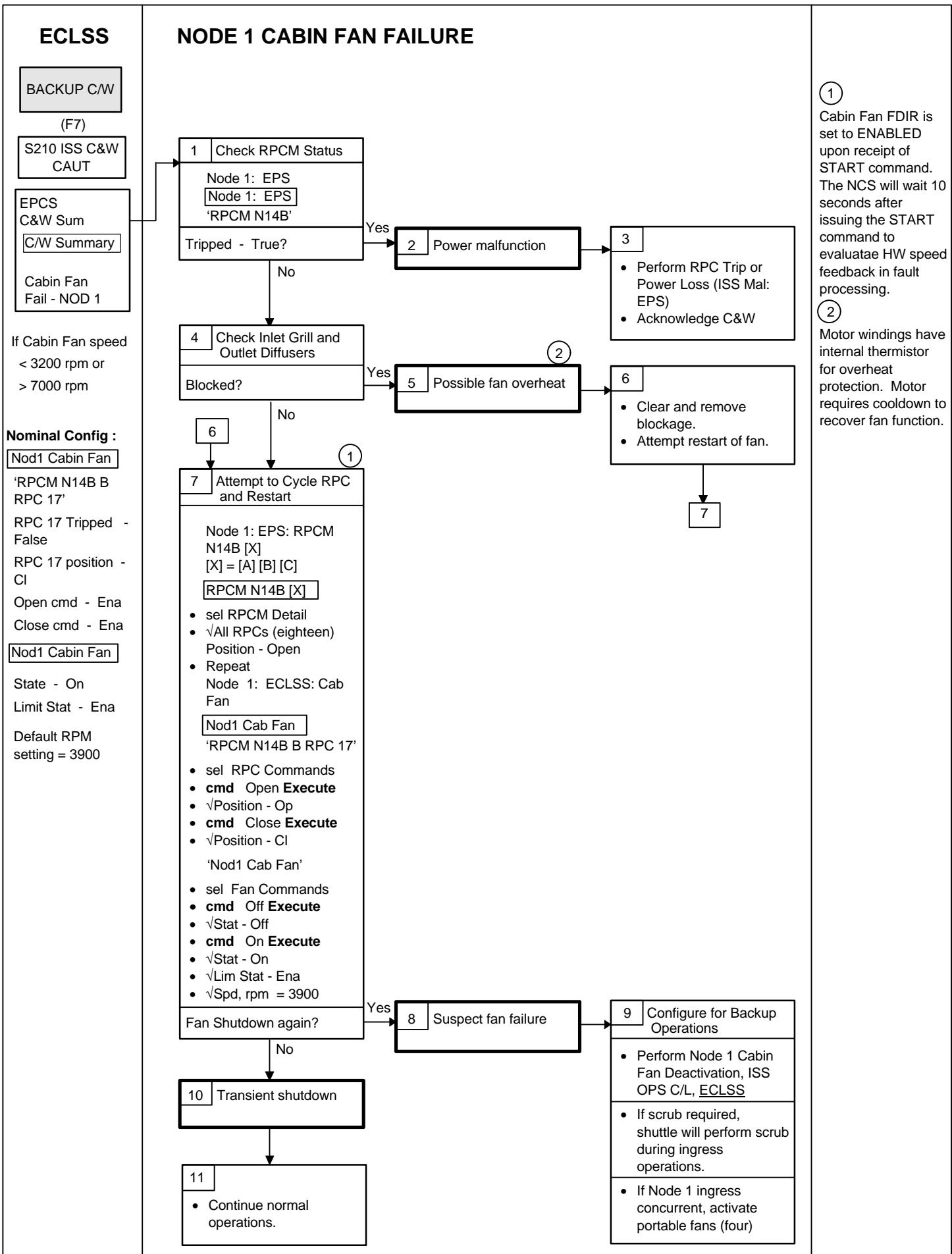
Nod1 SD 1(2) Fire Stat - No Fire

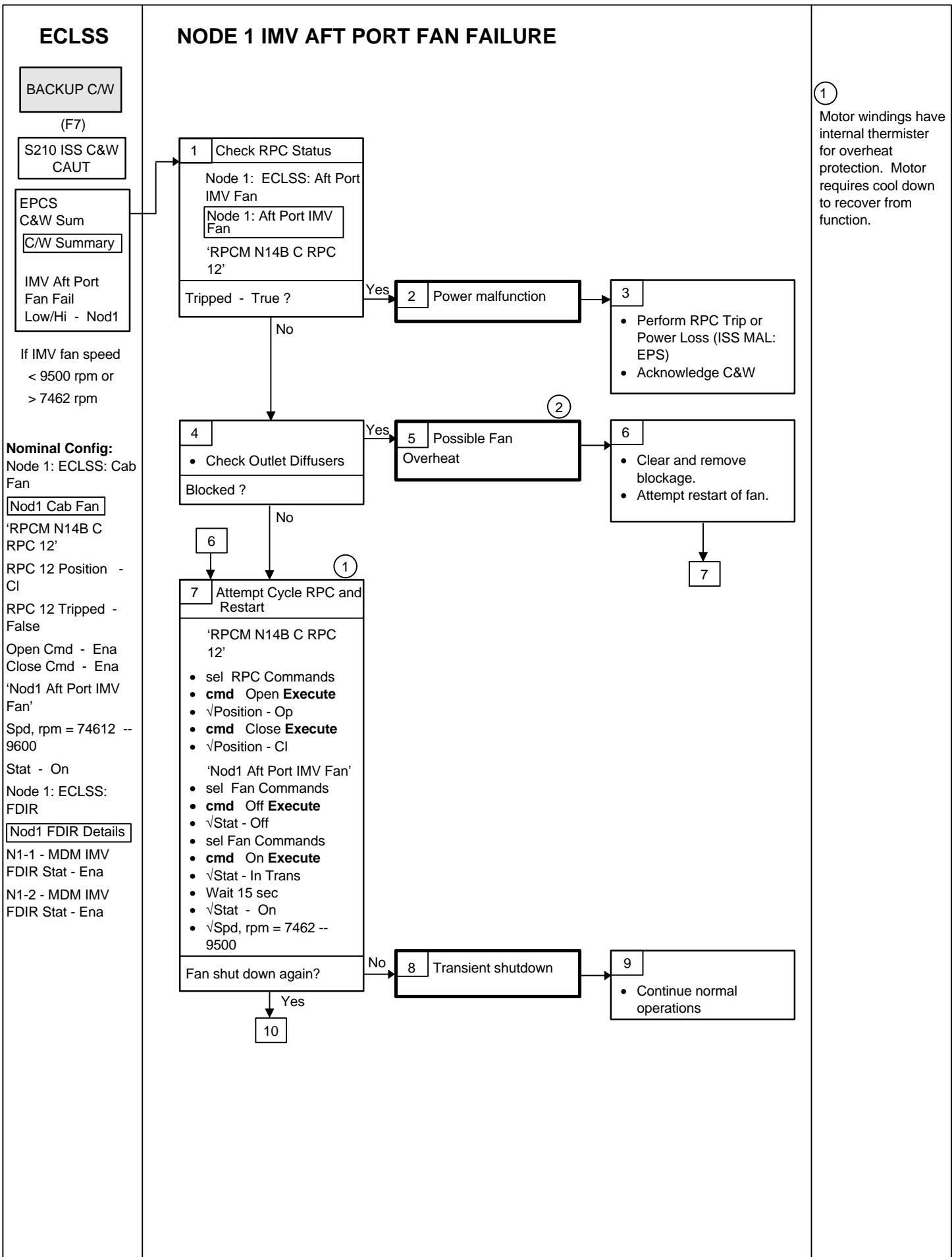
SCTR ~ 0.0% obs/m OBS ~ 0.0% contam

RPCM N14B(3B)  
C(A) RCP 03(16)  
Position - CIRPCM N14B(3B)  
C(A) RCP 03(16)  
Trip Stat - False**SMOKE DETECTOR MALFUNCTION**

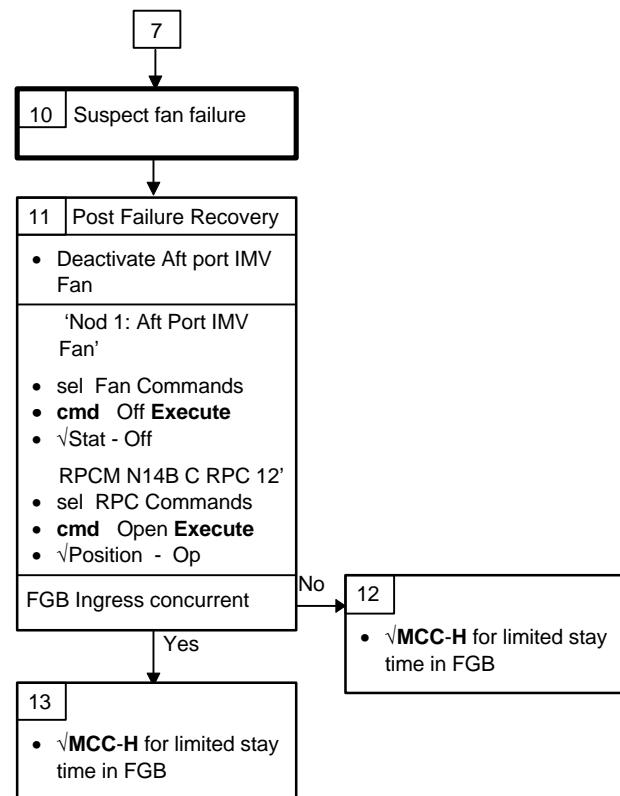
(1)

Action causes cautions to reset and triggers an Active BIT.





## NODE 1 IMV AFT PORT FAN FAILURE (Cont)



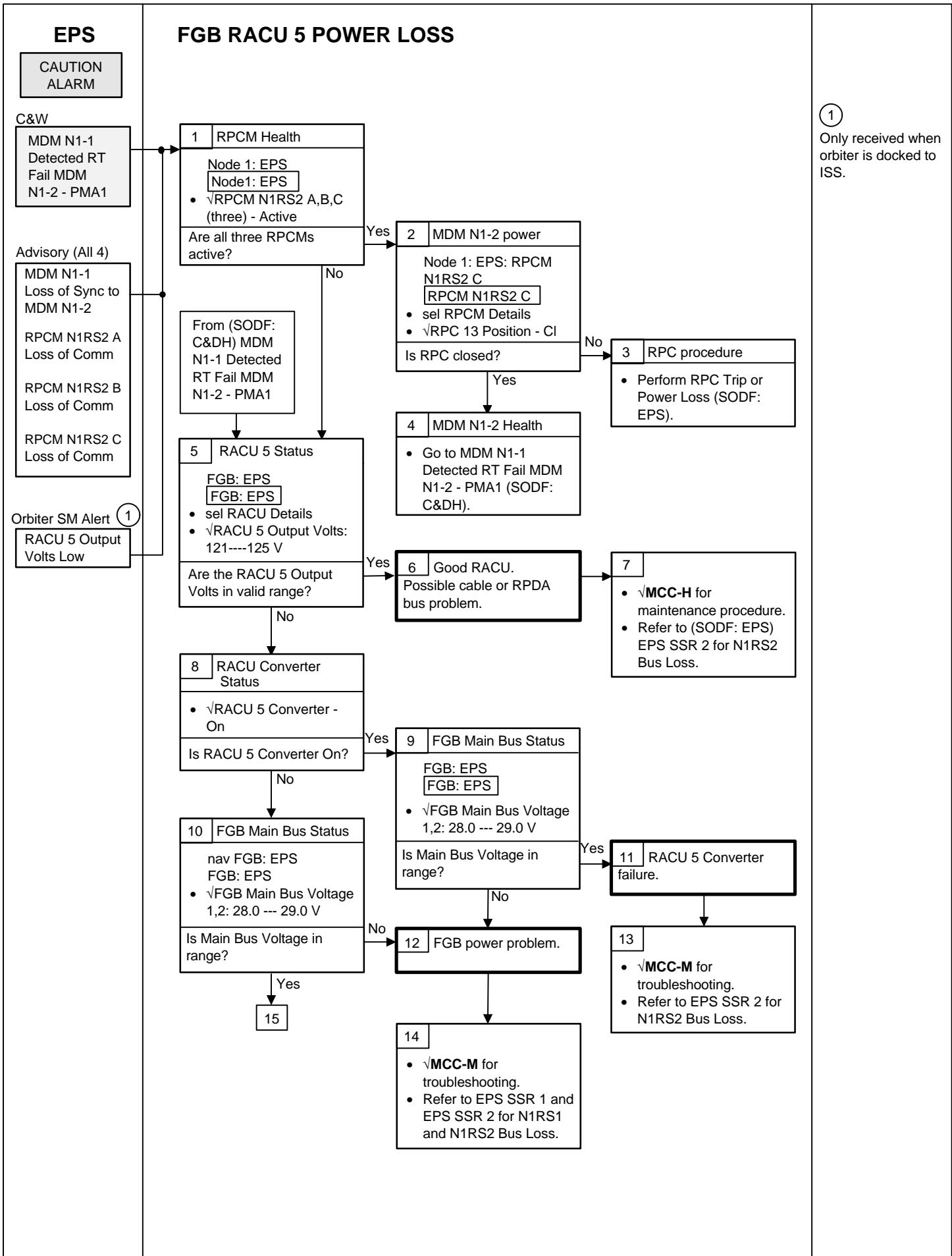
## EPS PROCEDURES

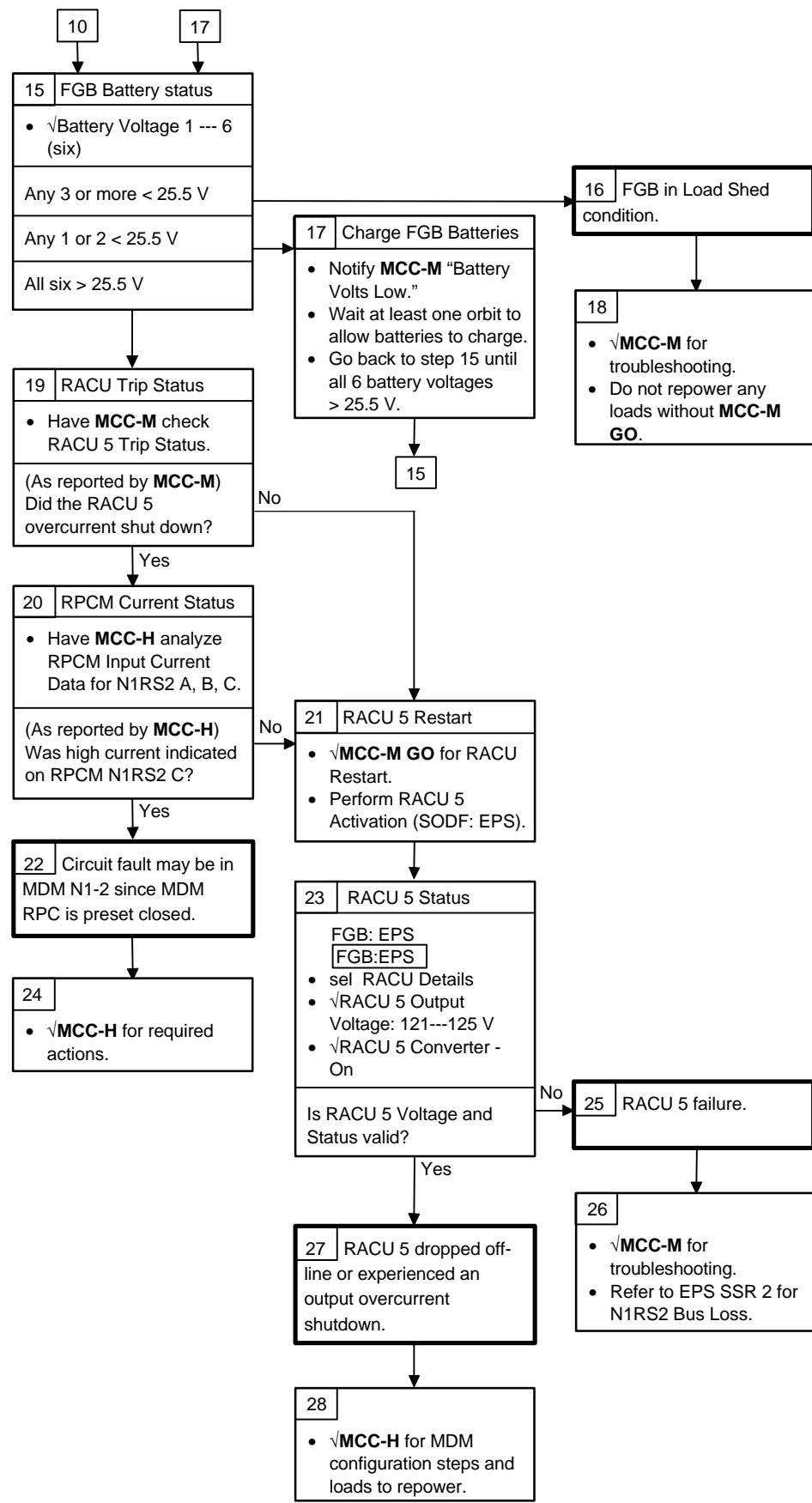
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FGB RACU 6 POWER LOSS .....	1-39
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RPCM LOSS OF COMM.....	1-42
EPS SSR-1 POWER BUS LOSS: RPDA N1RS1.....	1-45
EPS SSR-1a POWER BUS LOSS: RPCM N1RS1 A.....	1-46
EPS SSR-1b POWER BUS LOSS: RPCM N1RS1 B.....	1-47
EPS SSR-1c POWER BUS LOSS: RPCM N1RS1 C.....	1-48
EPS SSR-2 POWER BUS LOSS: RPDA N1RS2.....	1-49
EPS SSR-2a POWER BUS LOSS: RPCM N1RS2 A.....	1-50
EPS SSR-2b POWER BUS LOSS: RPCM N1RS2 B.....	1-51
EPS SSR-2c POWER BUS LOSS: RPCM N1RS2 C.....	1-52
EPS SSR-3 POWER BUS LOSS: RPDA N13B .....	1-53
EPS SSR-3a POWER BUS LOSS: RPCM N13B A .....	1-54
EPS SSR-3b POWER BUS LOSS: RPCM N13B B .....	1-55
EPS SSR-3c POWER BUS LOSS: RPCM N13B C .....	1-56
EPS SSR-4 POWER BUS LOSS: RPDA N14B .....	1-57
EPS SSR-4a POWER BUS LOSS: RPCM N14B A .....	1-58
EPS SSR-4b POWER BUS LOSS: RPCM N14B B .....	1-59
EPS SSR-4c POWER BUS LOSS: RPCM N14B C .....	1-60

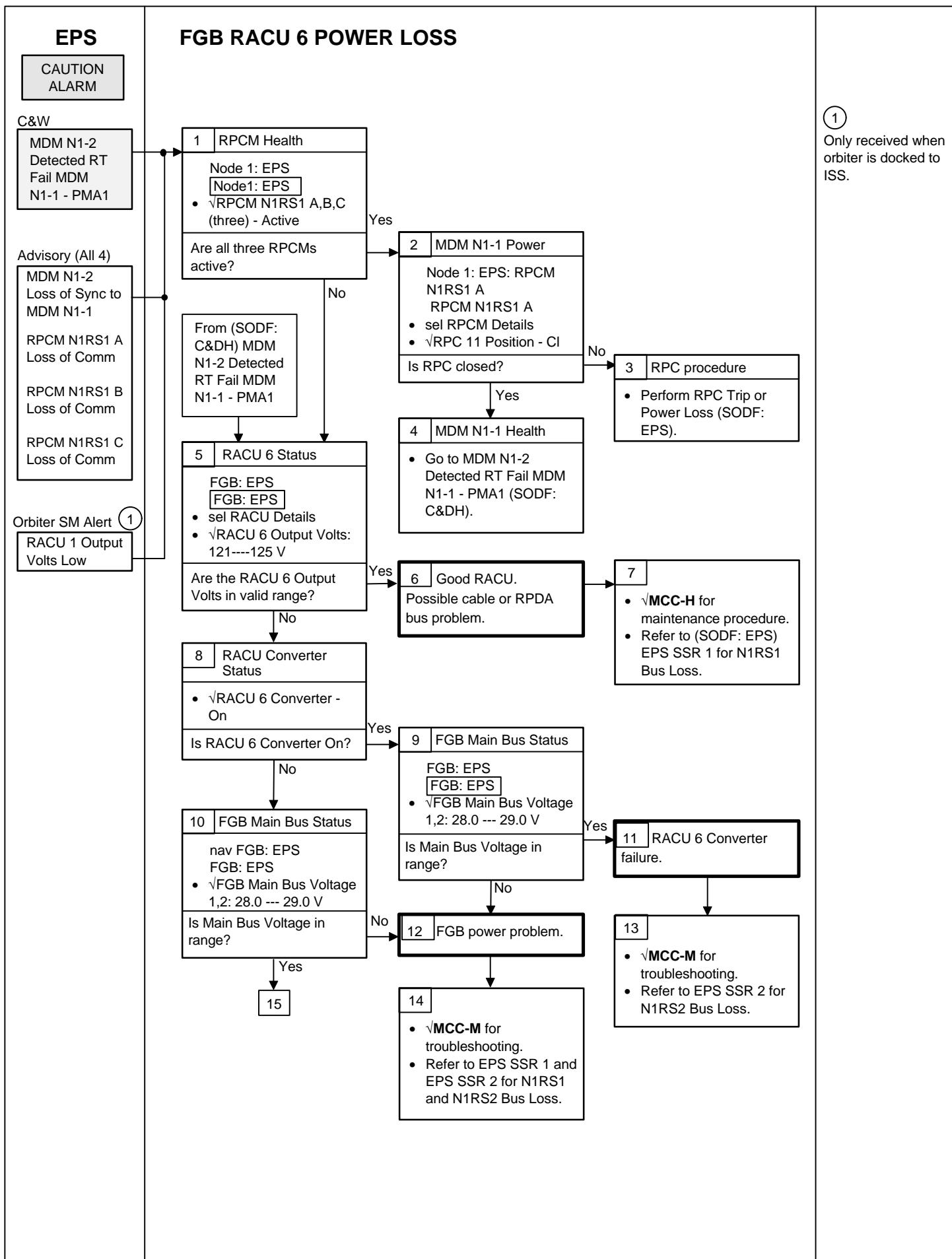
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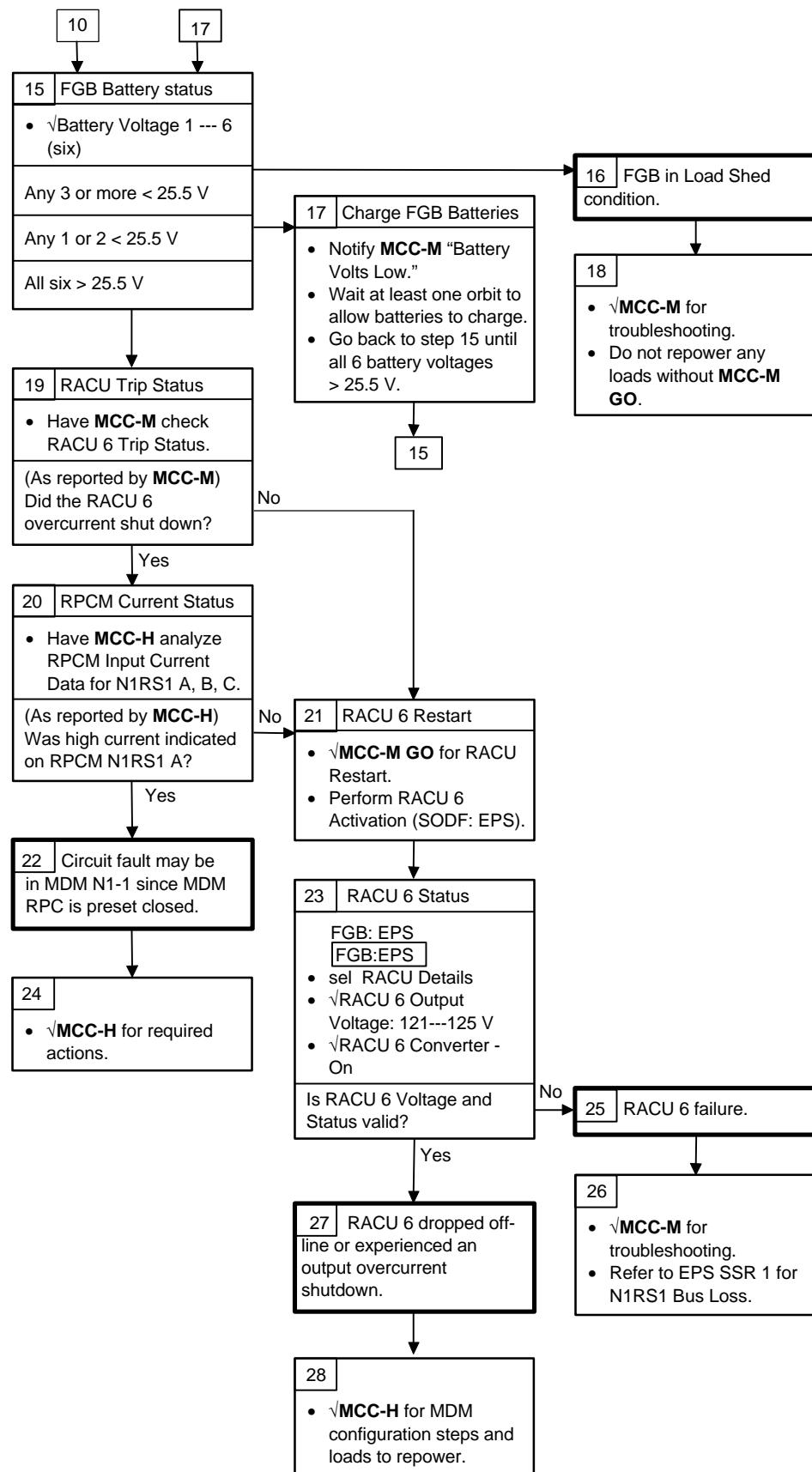
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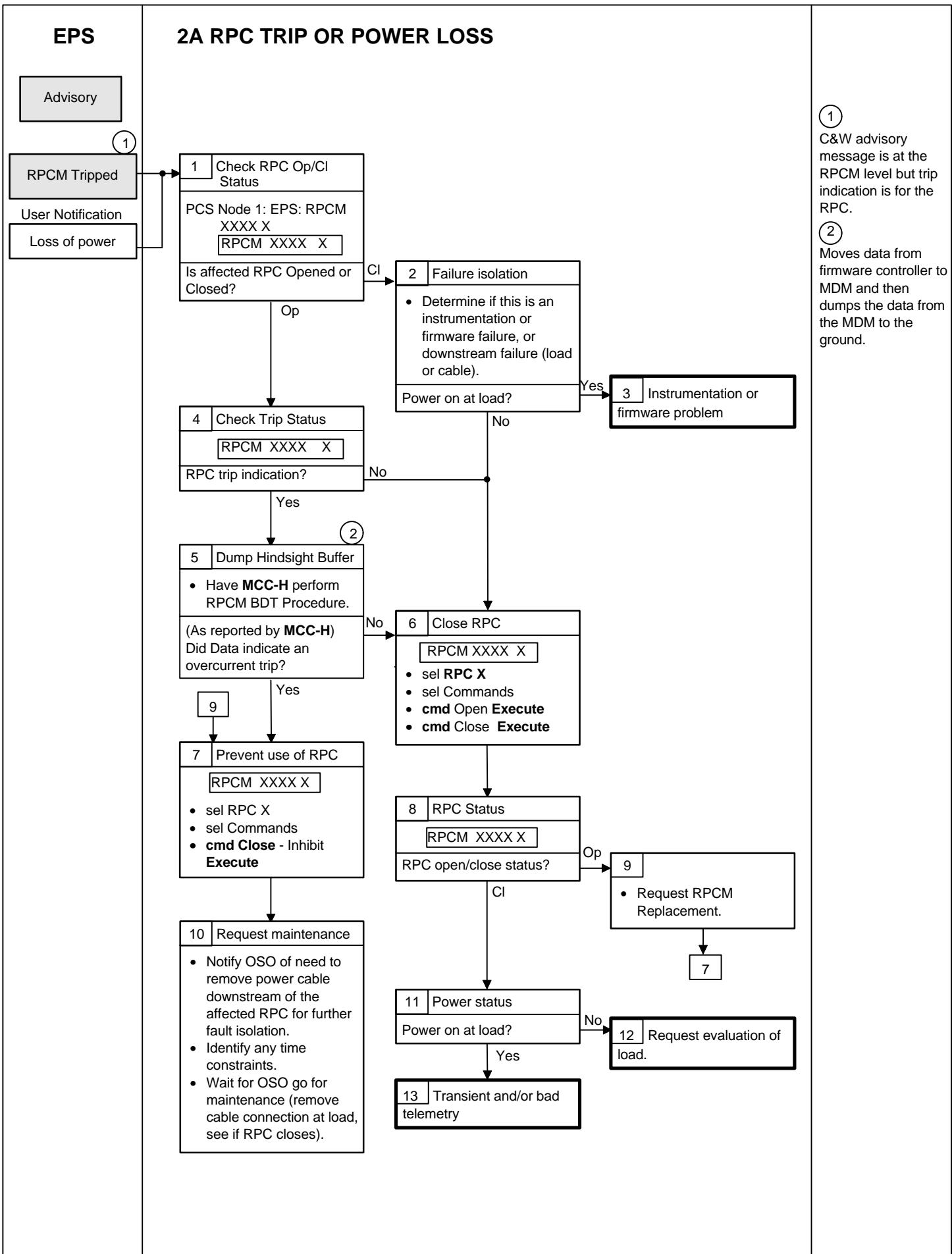
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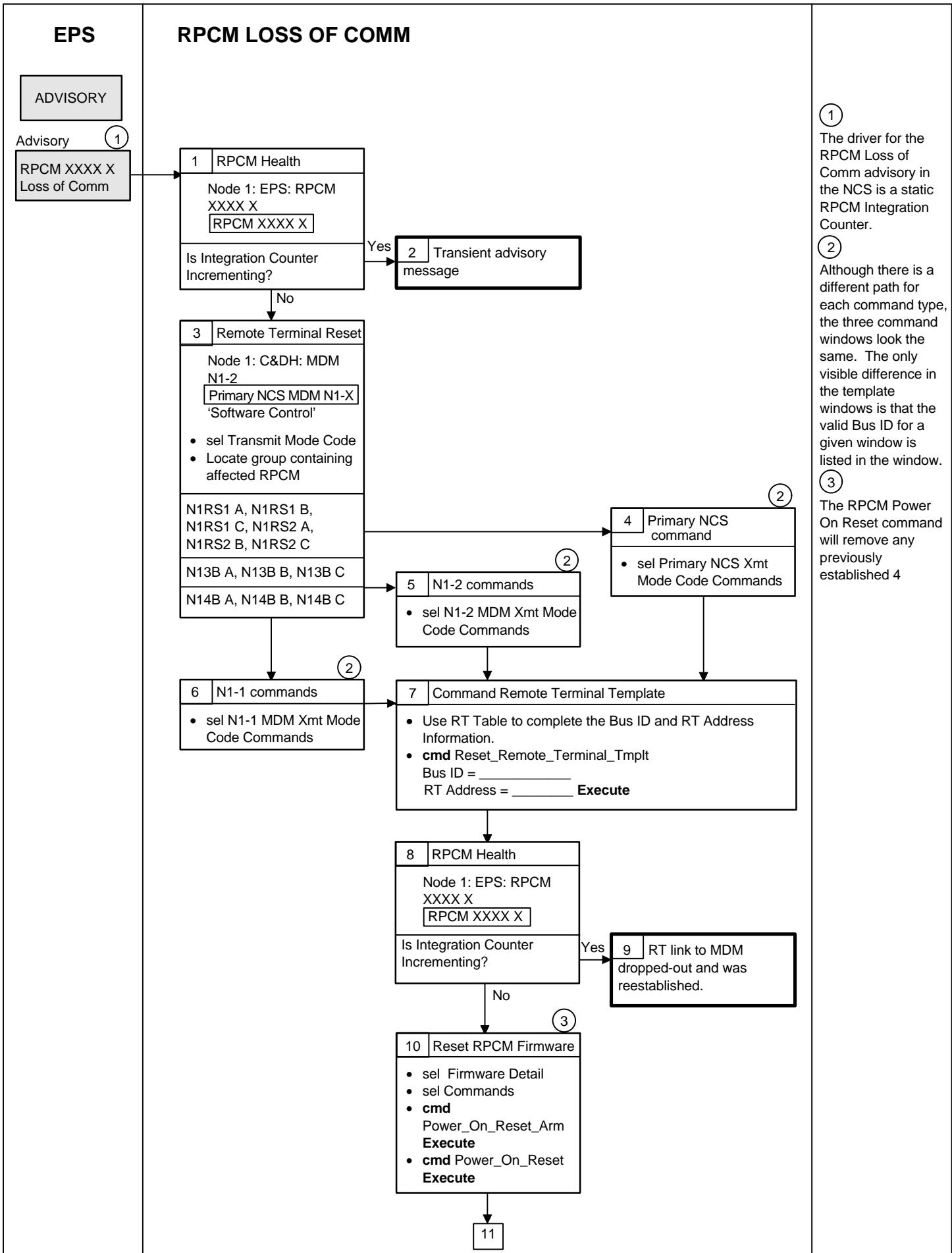


**FGB RACU 5 POWER LOSS (Cont)**

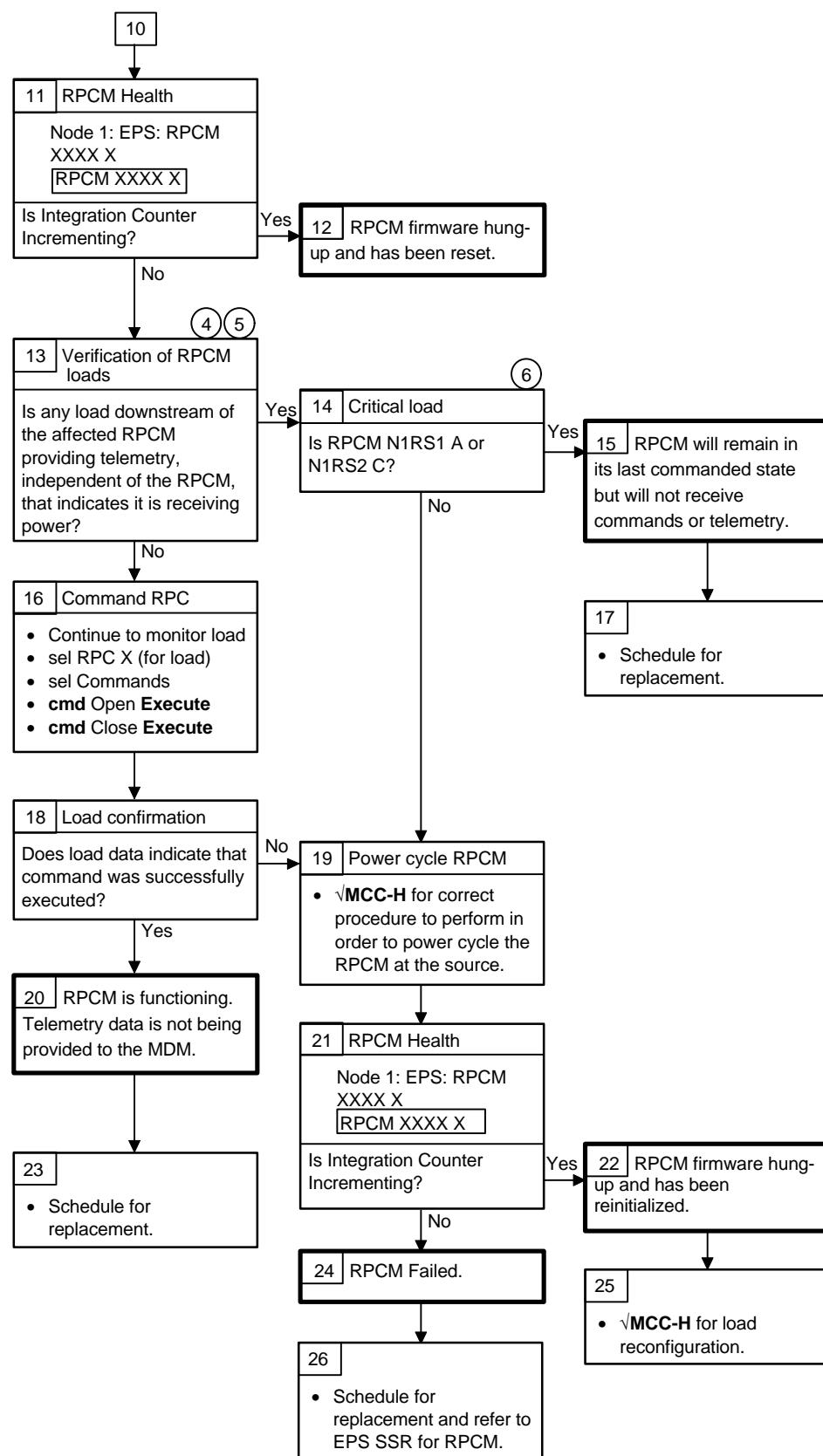


**FGB RACU 6 POWER LOSS (Cont)**





## RPCM LOSS OF COMM (Cont)



(4) Refer to Power Connectivity Table (SODF: Reference Data) for downstream loads.

(5) Possible confirming power indications include: MDM Frame Counter, Shell Temperatures, and Lights.

(6) RPCMs N1RS1 A and N1RS2 C provide power to the MDM N1-1 and MDM N1-2. Power cycling an RPCM with a known firmware problem may cause complete loss of the RPCM.

**RPCM RT TABLE**

RPCM	Bus Name	Bus ID	RT Address
N1RS1 A	UB EPS 14	2	20
N1RS1 B	UB EPS 14	2	19
N1RS1 C	UB EPS 14	2	18
N1RS2 A	UB EPS 23	3	20
N1RS2 B	UB EPS 23	3	19
N1RS2 C	UB EPS 23	3	18
N13B A	SYS LAB 2	11	20
N13B B	SYS LAB 2	11	19
N13B C	SYS LAB 2	11	18
N14B A	SYS LAB 1	11	20
N14B B	SYS LAB 1	11	19
N14B C	SYS LAB 1	11	18

# EPS SSR-1

## POWER BUS LOSS: RPDA N1RS1 (Includes RPCMs N1RS1 A, B, and C)

	ACTION	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
1	<p>PCS Node 1: C&amp;DH: MDM_N1-2   <input type="checkbox"/> Primary NCS  <input checked="" type="checkbox"/> ✓State - Primary, If no telemetry  <input checked="" type="checkbox"/> MCC-H.</p> <p>FGB: EPS   <input type="checkbox"/> FGB: EPS  <input checked="" type="checkbox"/> If RACU 6 - On, Perform RACU 6 Deactivate procedure (SODF: EPS).</p>	N1-1 MDM MDM N1-2 Srv Htr	<p><u>Caution Messages:</u> MDM N1-2 Detected RT Fail MDM N1-1 - PMA 1</p> <p><u>Advisory Messages:</u> RPCM N1RS1 A Loss Of Comm - NOD1 RPCM N1RS1 B Loss Of Comm - NOD1 RPCM N1RS1 C Loss Of Comm - NOD1 MDM N1-2 Loss of Sync To MDM N1-1</p> <p><u>Telemetry:</u> PCS Node 1: EPS   <input type="checkbox"/> NODE1: EPS</p>	<p>① Both MDMs are nominally active. In the event of loss of the primary MDM, the alternate MDM will automatically transition to primary.</p>
		RPCM N1RS1 A (Type V) RPCM N1RS1 B (Type V) RPCM N1RS1 C (Type V) Control of RPCM N14B A Control of RPCM N14B B Control of RPCM N14B C		<p>② String B of the Node 1 and PMA 1 Shell Heaters are nominally primary.</p>
2		Node 1 Shell Htrs String A PMA1 Shell Htrs String A		<p>③ Since the Early Comm antennas are lost, the entire Early Comm system is lost. The internal Early Comm equipment is powered off, except for the Transceiver. The Transceiver remains powered to provide survival heater power.</p>
3	<p>Node 1: EPS: RPCM: N1RS2   <input type="checkbox"/> RPCM NIRS2 A  <input checked="" type="checkbox"/> sel RPCM Detail  <input checked="" type="checkbox"/> sel RPC [X]  <input checked="" type="checkbox"/> [X] = <input type="checkbox"/> 10 <input type="checkbox"/> 11  <input checked="" type="checkbox"/> cmd Open Execute  <input checked="" type="checkbox"/> Repeat</p>	<p>3 CBM N1 Stbd Sec 1 (Early Comm Port Ant Pwr)  4 CBM N1 Stbd Sec 2 (Early Comm Port Ant Htr)  CBM N1 Stbd Sec 3 (Early Comm Stbd Ant Pwr)  CBM N1 Stbd Sec 4 (Early Comm Stbd Ant Htr)</p>	<p>RPCM N1RS1 A - not Active RPCM N1RS1 B - not Active RPCM N1RS1 C - not Active   <input type="checkbox"/> FGB: EPS   <input type="checkbox"/> FGB: EPS</p>	<p>④ Normally the CBMs are powered off.</p>
		4 CBM N1 Port Sec (1 --- 4)  N1-1 SDO 1A Card: MDM N1-2 Opr Htr Node1 3-Way SDS Vlv-1 Solenoid Cmd Node1 3-Way SDS Vlv-1 Latch Cmd Node1 3-Way SDS Vlv-2 Solenoid Cmd  N1-1 SDO 1B Card	<p>RACU Details RACU 6 Converter - Off RACU 6 Output Current &lt; 1 AMP RACU 6 Output Voltage ~0 Volts</p>	<p>⑤ The RACU indications will only be valid, if the bus failure is due to a RACU failure.</p>

**EPS SSR-1a**  
**POWER BUS LOSS: RPCM N1RS1 A**

ACTION		EQUIP/FUNCTION LOST	CREW INDICATION	NOTES
1	PCS Node1: C&DH: MDM_N1-2 <div style="border: 1px solid black; padding: 2px;">Primary NCS MDM</div> ✓State - Primary If no telemetry, ✓MCC-H.  <b>On MCC GO</b> Perform RPCM Remove and Replace Procedure (SODF: OSO)	N1-1 MDM	<b>Caution Messages:</b> MDM N1-2 Detected RT Fail MDM N1-1 - PMA 1  <b>Advisory Messages:</b> RPCM N1RS1 A Loss Of Comm - NOD1 MDM N1-2 Loss Of Sync To MDM N1-1  <b>Telemetry:</b> PCS Node 1: EPS <div style="border: 1px solid black; padding: 2px;">NODE 1: EPS</div> RPCM N1RS1 A - not Active	① Both MDMs are nominally active. In the event of loss of the primary MDM, the alternate MDM will automatically transition to primary.  ② String B of the Node 1 and PMA 1 Shell Heaters are nominally primary.
		2 Node 1 Shell Htrs String A  Node1-1 SDO 1A Card: MDM N1-2 Opr Htr Node1 3-Way SDS Vlv Solenoid Cmd Node1 3-Way SDS Vlv-1 Latch Cmd Node1 3-Way SDS Vlv-2 Solenoid Cmd  Node1-1 SD1B O Card		

**EPS SSR-1b**  
**POWER BUS LOSS: RPCM N1RS1 B**

ACTION	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
<b>On MCC GO</b> Perform RPCM Remove and Replace Procedure (SODF: OSO)	RPCM N1RS1 B (Type V)  1 CBM N1 Port Sec (1 --- 4)	<u>Caution Messages:</u>  <u>Advisory Messages:</u> RPCM N1RS1 B Loss Of Comm - NOD1  <u>Telemetry:</u> PCS Node 1: EPS NODE 1: EPS  RPCM N1RS1 B - not Active	(1) Normally the CBMs are powered off.

**EPS SSR-1c**  
**POWER BUS LOSS: RPCM N1RS1 C**

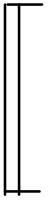
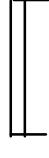
ACTION	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
<p>1</p> <p>Node 1: EPS: RPCM: N1RS2  <b>RPCM NIRS2 A</b></p> <p>sel    RPCM Detail      sel    RPC [X],</p> <p>[X] =    <b>[10]</b>    <b>[11]</b></p> <p><b>cmd Open Execute</b></p> <p>Repeat</p> <p><b>On MCC GO</b>      Perform RPCM Remove and Replace Procedure (SODF: OSO)</p>	<p>MDM N1 2 Srv Htr      RPCM N1RS1 C (Type V)</p> <p>1 PMA1 Shell Htrs String A</p> <p>2 CBM N1 Stbd Sec 1 (Early Comm Port Ant Pwr)</p> <p>3 CBM N1 Stbd Sec 2 (Early Comm Port Ant Htr)      CBM N1 Stbd Sec 3 (Early Comm Stbd Ant Pwr)      CBM N1 Stbd Sec 4 (Early Comm Stbd Ant Htr)</p>	<p><u>Caution Messages:</u></p> <p><u>Advisory Messages:</u>      RPCM N1RS1 C Loss Of Comm - NOD1</p> <p><u>Telemetry:</u>      PCS    Node 1: EPS  <b>NODE 1: EPS</b></p> <p>RPCM N1RS1 C - not Active</p>	<p>(1) String B of the Node 1 and PMA 1 Shell Heaters are nominally primary.</p> <p>(2) Normally the CBMs are not powered.</p> <p>(3) Since the Early Comm antennas are lost, the entire Early Comm system is lost. The internal Early Comm equipment is powered off, except for the Transceiver. The Transceiver remains powered to provide survival heater power</p>

## EPS SSR-2

### POWER BUS LOSS: RPDA N1RS2 (Includes RPCMs N1RS2 A, B, and C)

	ACTION	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
1	<p>PCS Node 1: C&amp;DH: MDM_N1-1 <b>Primary NCS MDM</b> ✓State - Primary If no telemetry, ✓MCC-H</p> <p>FGB EPS <b>FGB: EPS</b> If RACU5 - On Perform RACU 5 Deactivate procedure (SODF: EPS).</p> <p>If during Node 1 Pre-Ingress Warm-up, Ingress, or Post Egress Dryout ✓MCC-H for heater configuration.</p> <p>Node 1:TCS <b>NODE 1:TCS</b> 'Node 1'</p> <p>sel Node 1 Htr [X] A [X] = <b>1 2 3 4 5 6</b> <b>7 8 9</b> <b>cmd Ena Opr Execute</b> Repeat</p> <p>Node 1: TCS <b>NODE 1: TCS</b> 'PMA 1'</p> <p>sel PMA1 [X] A [X] = <b>1 3 4 5 7</b> <b>cmd Ena Opr Execute</b> Repeat</p>	<p>N1-2 MDM MDM N1-1 Srv Htr</p> <p>RPCM N1RS2 A (Type V) RPCM N1RS2 B (Type V) RPCM N1RS2 C (Type V) Control of RPCM N13B A Control of RPCM N13B B Control of RPCM N13B C</p> <p>2 Node 1 Shell Htrs String B PMA 1 Shell Htrs String B</p>	<p><u>Caution Messages:</u> MDM N1-1 Detected RT Fail MDM N1-2 - PMA 1</p> <p><u>Advisory Messages:</u> RPCM N1RS2 A Loss Of Comm - NOD1 RPCM N1RS2 B Loss Of Comm - NOD1 RPCM N1RS2 C Loss Of Comm - NOD1 MDM N1-1 Loss of Sync To MDM N1-2</p> <p><u>Telemetry:</u> PCS Node 1: EPS <b>NODE 1: EPS</b> RPCM N1RS2 A - not Active RPCM N1RS2 B - not Active RPCM N1RS2 C - not Active</p> <p>FGB: EPS <b>FGB:EPS</b> RACU Details RACU 5 Converter - Off RACU 5 Output Current &lt; 1 Amp RACU 5 Output Voltage ~0 volts</p>	<p>① Both MDMs are nominally active. In the event of loss of the primary MDM, the alternate MDM will automatically transition to primary.</p> <p>② String B of the Node 1 and PMA 1 Shell Heaters are nominally primary.</p> <p>③ Since the internal Early Comm equipment is lost, the entire Early Comm system is lost. Power to the Port and Stbd antennas is removed.</p> <p>④ Normally the CBMs are powered off.</p> <p>⑤ The RACU indications will only be valid, if the bus failure is due to a RACU failure.</p>
3	<p>Node 1: EPS: RPCM: N1RS1 <b>RPCM N1RS1 C</b></p> <p>sel RPCM Detail sel RPC [X], [X] = <b>5 12</b> <b>cmd Open Execute</b> Repeat</p>	<p>CBM N1 Stbd Pri 1 (Early Comm Transceiver Pwr &amp; Htr)</p> <p>3 CBM N1 Stbd Pri 2 (Early Comm Spare)</p> <p>4 CBM N1 Stbd Pri 3 (Early Comm CTP)</p> <p>CBM N1 Stbd Pri 4 (Early Comm RFPDB)</p> <p>4 CBM N1 Port Pri (1 --- 4)</p> <p>Nod1-2 SDO 1A Card MDM N1-1 Opr Htr</p> <p>N1-2 SDO 1B Card</p>		

**EPS SSR-2a**  
**POWER BUS LOSS: RPCM N1RS2 A**

ACTION	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
<p>If during Node 1 Pre-Ingress Warm-up, Ingress, or Post Egress Dryout, <b>\MCC-H</b> for heater configuration.</p> <p>Node 1: TCS  <b>NODE 1: TCS</b>  'NODE 1'</p> <p>sel Node 1 Htr [X] A  [X] = <b>1 2 3 4 5 6</b>  <b>7 8 9</b></p> <p><b>cmd Ena Opr</b>  <b>Execute</b></p>  <p>Repeat</p>	<p>RPCM N1RS2 A (Type V)</p> <p>1 Node1 Shell Htrs String B</p>	<p><u>Caution Messages:</u></p> <p><u>Advisory Messages:</u>  RPCM N1RS2 A Loss Of Comm - NOD1</p> <p><u>Telemetry:</u>  PCS Node 1: EPS  <b>NODE 1: EPS</b></p> <p>RPCM N1RS2 A - not Active</p>	<p>(1) String B of the Node 1 and PMA 1 Shell Heaters are nominally primary.</p> <p>(2) Since the internal Early Comm equipment is lost, the entire Early Comm system is lost. Power to the Port and Stbd antennas is removed.</p> <p>(3) Normally the CBMs are powered off.</p>
<p>2 Node1: EPS: RPCM: N1RS1  <b>RPCM NIRS1 C</b></p> <p>sel RPCM Detail  sel RPC [X],  [X] = <b>5 12</b></p> <p><b>cmd Open</b> <b>Execute</b></p>  <p>Repeat</p> <p><b>On MCC GO</b>  Perform RPCM Remove and Replace Procedure (SODF: OSO)</p>	<p>2 CBM N1 Stbd Pri 1 (Early Comm Transceiver Pwr &amp; Htr)</p> <p>3 CBM N1 Stbd Pri 2 (Early Comm Spare)  CBM N1 Stbd Pri 3 (Early Comm CTP)  CBM N1 Stbd Pri 4 (Early Comm RFPDB)</p>		

**EPS SSR-2b**  
**POWER BUS LOSS: RPCM N1RS2 B**

ACTION	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
<p><b>On MCC GO</b>            Perform RPCM Remove and Replace Procedure (SODF: OSO)</p>	RPCM N1RS2 A (Type V)	<u>Caution Messages:</u>  <u>Advisory Messages:</u> RPCM N1RS2 B Loss Of Comm - NOD1  <u>Telemetry:</u> PCS Node 1: EPS <div style="border: 1px solid black; padding: 2px;">NODE 1: EPS</div> RPCM N1RS2 B - not Active	<div style="border: 1px solid black; border-radius: 50%; padding: 2px; margin-right: 5px;">1</div> This RPCM powers the PMA3 heaters which are not available until 3A.

**EPS SSR-2c**  
**POWER BUS LOSS: RPCM N1RS2 C**

	ACTION	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
1	<p>PCS Node 1: C&amp;DH: MDM_N1-1 <b>Primary NCS MDM</b></p> <p>✓State - Primary If no telemetry, ✓<b>MCC-H</b></p> <p>If during Node 1 Pre-Ingress Warm-up, Ingress, or Post Egress Dryout, ✓<b>MCC-H</b> for heater configuration.</p> <p>Node 1: TCS <b>NODE 1: TCS</b> 'PMA 1'</p> <p>sel PMA1 [X] A [X] = <b>1 3 4 5 7</b> <b>cmd Ena Opr</b> <b>Execute</b></p> <p>Repeat</p> <p><b>On MCC GO</b> Perform RPCM Remove and Replace Procedure (SODF: OSO)</p>	<p>N1-2 MDM MDM N1-1 Srv Htr</p> <p>RPCM N1RS2 C (Type V) Control of RPCM N13B A Control of RPCM N13B B Control of RPCM N13B C</p> <p>2 PMA1 Shell Htrs String B</p> <p>3 CBM N1 Port Pri (1--- 4) N1-2 SDO 1A Card MDM N1-1 Opr Htr</p> <p>N1-1 SDO 1B Card</p>	<p><u>Caution Messages:</u> MDM N1-1 Detected RT Fail MDM N1-2 - PMA 1</p> <p><u>Advisory Messages:</u> RPCM N1RS 2 C Loss Of Comm - NOD1 MDM N1-1 Loss of Sync To MDM N1-2</p> <p><u>Telemetry:</u> PCS Node 1: EPS <b>[NODE 1: EPS]</b></p> <p>RPCM N1RS2 C - not Active</p>	<p>(1) Both MDMs are nominally active. In the event of loss of the primary MDM, the alternate MDM will automatically transition to primary.</p> <p>(2) String B of the PMA 1 Shell Heaters are nominally primary.</p> <p>(3) Normally the CBMs are powered off.</p>

**EPS SSR-3**
**POWER BUS LOSS: RPDA N13B (Includes RPCM N13B A, N13B B, and N13B C)**

ACTION	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
CRT  SM 200 APCU Status  APCU 1 OUT VOLTS RES LOW = 0 If not, perform APCU Deact procedure (SODF: EPS)	RPCM N13B A (Type V) RPCM N13B B (Type V) RPCM N13B C (Type V)	Caution Messages: Smoke Detector 2 Fail - NOD1  Advisory Messages: RPCM N13B A Loss Of Comm - NOD1 RPCM N13B B Loss Of Comm - NOD1 RPCM N13B C Loss Of Comm - NOD1  Telemetry: CRT  SM 200 APCU Status	(1) For IMV valves, use manual override.  (2) Normally the CBMs are powered off.  (3) The APCU indications will only be valid, if the bus failure is due to an APCU failure.
	1 IMV Stbd Aft Fan IMV Deck Aft Vlv IMV Deck Fwd Vlv IMV Fwd Stbd Vlv IMV Fwd Port Vlv IMV Port Fwd Fan  2 CBM N1 Nad Pri (1 --- 4) CBM N1 Zen Pri (1 --- 4) CBM N1 Fwd Pri (1 --- 4)  Smoke Detector 2  LT Int NOD1OS4 LT Int NOD1OS2-1 LT Int NOD1PD2 LT Int NOD1OS2	3 APCU 1 CONV A OUT AMPS ~0 APCU 1 CONV B OUT AMPS ~0 APCU 1 OUT VOLTS RES LOW = 0  PCS Node 1: EPS  NODE 1: EPS  RPCM N14B A - not Active RPCM N14B B - not Active RPCM N14B C - not Active	

**EPS SSR-3a**  
**POWER BUS LOSS: RPCM N13B A**

ACTION	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
<b>On MCC GO</b> Perform RPCM Remove and Replace Procedure (SODF: OSO)	RPCM N13B A (Type V)  IMV Stbd Aft Fan  Smoke Detector 2  LT Int NOD1OS4 LT Int NOD1OS2-1	<b>Caution Messages:</b> Smoke Detector 2 Fail - NOD1  <b>Advisory Messages:</b> RPCM N13B A Loss Of Comm - NOD1  <b>Telemetry:</b> PCS Node 1: EPS Node 1: EPS  RPCM N13B A - not Active	

**EPS SSR-3b**  
**POWER BUS LOSS: RPCM N13B B**

ACTION	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
<b>On MCC GO</b> Perform RPCM Remove and Replace Procedure (SODF: OSO)	RPCM N13B B (Type V)	<u>Caution Messages:</u> <u>Advisory Messages:</u> RPCM N13B B Loss Of Comm - NOD1 <u>Telemetry:</u> PCS Node 1: EPS <div style="border: 1px solid black; padding: 2px;">Node 1: EPS</div> RPCM N13B B - not Active	① For IMV valves, use the manual override. ② Normally the CBMs are powered off.
	1 IMV Deck Aft Vlv IMV Deck Fwd Vlv  2 CBM N1 Nad Pri (1 --- 4) CBM N1 Zen Pri (1 --- 4)  LT Int NOD1PD2		

**EPS SSR-3c**  
**POWER BUS LOSS: RPCM N13B C**

ACTION	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
<b>On MCC GO</b> Perform RPCM Remove and Replace Procedure (SODF: OSO)	RPCM N13B C (Type V)	<u>Caution Messages:</u>  <u>Advisory Messages:</u> RPCM N13B C Loss Of Comm - NOD1  <u>Telemetry:</u> PCS Node 1: EPS [NODE 1: EPS]  RPCM N13B C - not Active	(1) For IMV valves, use the manual override.  (2) Normally the CBMs are powered off.
	1 IMV Fwd Stbd Vlv IMV Fwd Port Vlv  2 CBM N1 Fwd Pri (1 --- 4)  LT Int NOD1OS2		

**EPS SSR-4**
**POWER BUS LOSS: RPDA N14B (Includes RPCMs N14B A, B, and C)**

ACTION	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
CRT  SM 200 APCU Status  √APCU 2 OUT VOLTS RES LOW = 0 If not, perform APCU Deact procedure (SODF: EPS)  If crew members in Node 1 or FGB, turn on portable fans installed in Node 1.	RPCM N14B A (Type V) RPCM N14B B (Type V) RPCM N14B C (Type V)  1 Cabin Fan IMV Stbd Fwd Vlv IMV Aft Stbd Vlv IMV Aft Port Vlv IMV Aft Port Fan IMV Stbd Aft Vlv IMV Port Fwd Vlv RMAV  2 CBM N1 Nad Sec (1 --- 4) CBM N1 Zen Sec (1 --- 4) CBM N1 Fwd Sec (1 --- 4)  Smoke Detector 1  LT Int NOD1SD2 LT Int NOD1OP4 LT Int NOD1OP2-1 LT Int NOD1OP2-2	Caution Messages: Smoke Detector 1 Fail - NOD1  Advisory Messages: RPCM N14B A Loss Of Comm - NOD1 RPCM N14B B Loss Of Comm - NOD1 RPCM N14B C Loss Of Comm - NOD1  Telemetry: CRT  SM 200 APCU Status  3 APCU 2 CONV A OUT AMPS ~0 APCU 2 CONV B OUT AMPS ~0 APCU 2 OUT VOLTS RES LOW = 0  PCS Node 1: EPS [Node 1: EPS]  RPCM N14B A - not Active RPCM N14B B - not Active RPCM N14B C - not Active	(1) For IMV valves, use manual override.  (2) Normally the CBMs are powered off.  (3) The APCU indications will only be valid, if the bus failure is due to an APCU failure.

**EPS SSR-4a**  
**POWER BUS LOSS: RPCM N14B A**

ACTION	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
<b>On MCC GO</b> Perform RPCM Remove and Replace Procedure (SODF: OSO)	RPCM N14B A (Type V)	<u>Caution Messages:</u>  <u>Advisory Messages:</u> RPCM N14B A Loss Of Comm - NOD1  <u>Telemetry:</u> PCS Node 1: EPS NODE 1: EPS  RPCM N14B A - not Active	(1) Normally the CBMs are powered off.  (2) For IMV valves, use manual override.
	1 IMV Stbd Fwd Vlv  2 CBM N1 Fwd Sec (1 --- 4)		

**EPS SSR-4b**  
**POWER BUS LOSS: RPCM N14B B**

ACTION	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
If crew members in Node1 or FGB, turn on portable fans installed in Node 1.	RPCM N14B B (Type V)	<u>Caution Messages:</u>  <u>Advisory Messages:</u> RPCM N14B B Loss Of Comm - NOD1	(1) Normally the CBMs are powered off.
<b>On MCC GO</b> Perform RPCM Remove and Replace Procedure (SODF: OSO)	Cabin Fan RAMV	<u>Telemetry:</u> PCS Node 1: EPS Node 1: EPS	
	1 CBM N1 Nad Sec (1 --- 4) CBM N1 Zen Sec (1 --- 4)	RPCM N14B B - not Active	

**EPS SSR-4c**  
**POWER BUS LOSS: RPCM N14B C**

ACTION	EQUIP/FUNCTION LOST	CREW INDICATIONS	NOTES
<b>On MCC GO</b> Perform RPCM Remove and Replace Procedure (SODF: OSO)	RPCM N14B C (Type V)	<u>Caution Messages:</u> Smoke Detector 1 Fail - NOD1	(1) For IMV valves, use manual override.
	Smoke Detector 1	<u>Advisory Messages:</u> RPCM N14B C Loss Of Comm - NOD1	(2) Normally the CBMs are powered off.
	1 Cabin Fan IMV Stbd Fwd Vlv IMV Aft Port Vlv IMV Aft Port Fan IMV Stbd Aft Vlv IMV Port Fwd Vlv RMAV	<u>Telemetry:</u> PCS Node 1: EPS Node 1: EPS	
	2 CBM N1 Zen Sec (1 --- 4) CBM N1 Nad Sec (1 --- 4)  LT Int NOD1OP4 LT Int NOD1OP2-1 LT Int NOD1OP2-1 LT Int NOD1OP2-2	RPCM N14B C - not Active	

MECH PROCEDURES

HATCH MECHANISM MALFUNCTION..... 1-63

MECH

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**MECH**

## HATCH MECHANISM MALFUNCTION

### OBJECTIVE:

Identify failed hatch mechanism.

### LOCATION:

Installed: U.S. Common Hatch Rib side

Stowed: None

### DURATION:

30 minutes

### TOOLS REQUIRED:

None

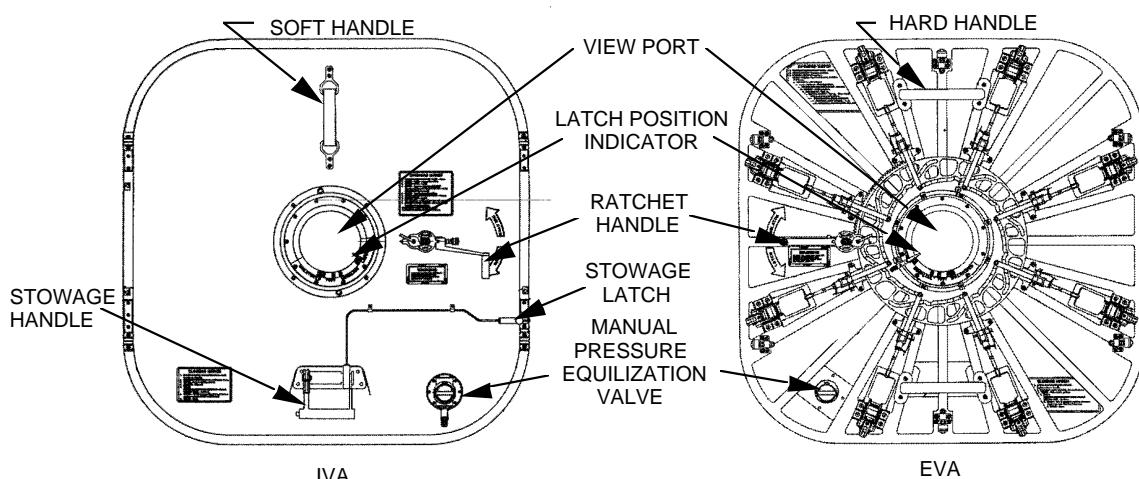


Figure 1.- Dome/Rib.

### **WARNING**

To ensure crew members have immediate ingress/egress between modules in case of emergency, hatch latches are open.

### REMOVE

1. Close, but do not place Hatch against bulkhead.
2. Check Hatch for obvious bent or broken parts.
3. If no defect found
  - | Continue with procedure
- If defect found
  - | Use appropriate maintenance procedure

NOTE

The next steps are to exercise hatch mechanism while attempting to identify failed ORU.

4. Cycle hatch crank back and forth to attempt to identify failed ORU.
5. If unable to identify failed ORU
  - | Continue with procedure
  - | If able to identify failed ORU
    - | Use appropriate maintenance procedure
6. Disconnect tension rods (eight) from drive mechanism by removing pip pins.
7. Secure loose ends of tension rods (eight) away from drive mechanism.  
Use tape to secure loose ends.
8. Cycle crank.
9. If crank does not bind, jam or have any other defect
  - | Continue procedure
  - | If crank does bind, jam, or have any other defect
    - | Attempt to identify if pinion gear or drive mechanism failed
10. If pinion gear is failed
  - | Remove and replace Hatch
  - | If pinion gear is not failed
    - | Remove and replace hatch drive mechanism

NOTE

After each installation of tension rod, the hatch crank is cycled to determine if newly installed tension rod/latch assembly is defective.

11. Install tension rods one at a time (eight), cycle hatch crank after each installation to determine if it is failed.
12. If failed tension rod/latch assembly determined, label failed tension rod/latch assembly.
13. Remove, repair, replace failed tension rod/latch assembly.

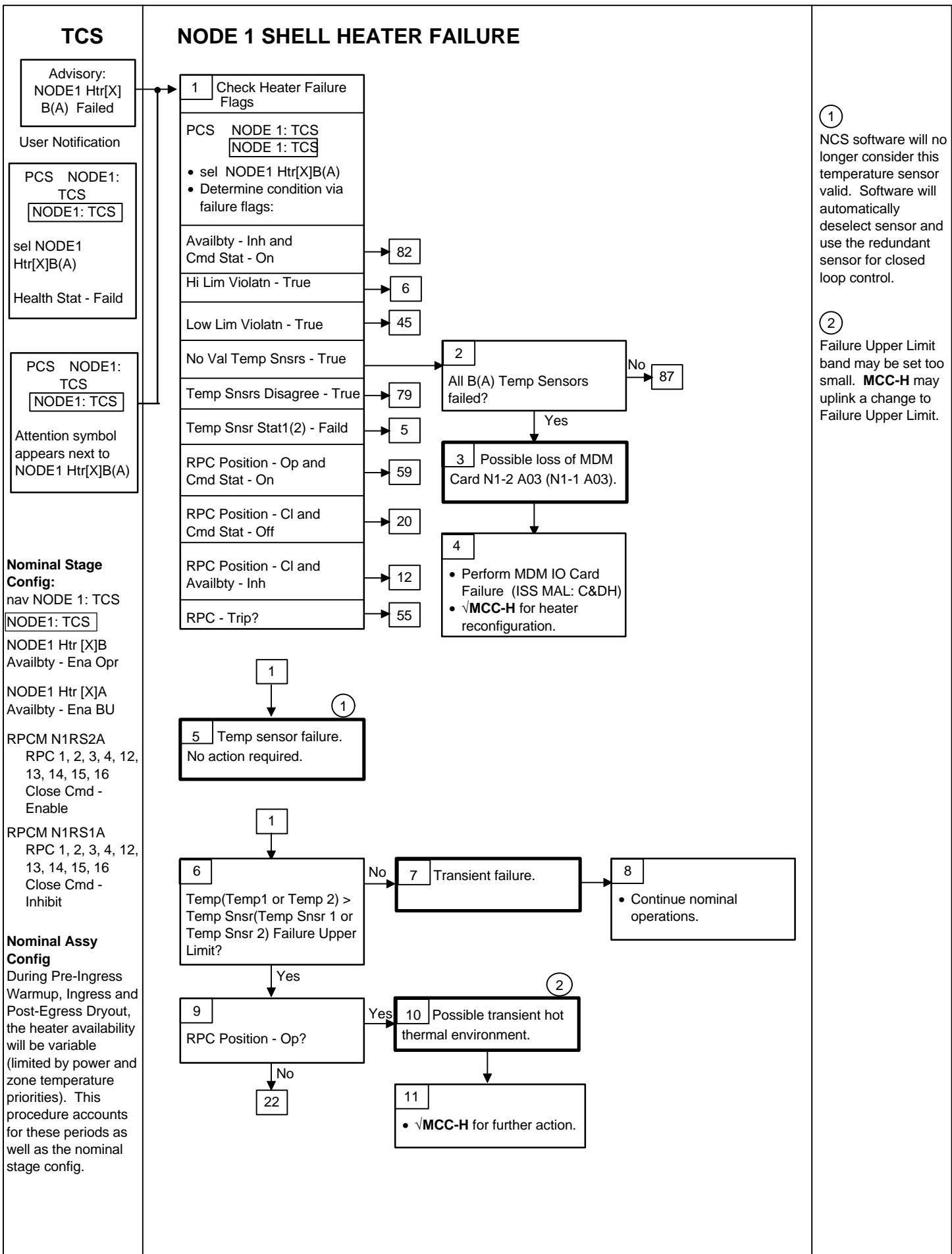
## TCS PROCEDURES

NODE 1 SHELL HEATER FAILURE.....	1-67
PMA 1 SHELL HEATER FAILURE.....	1-77

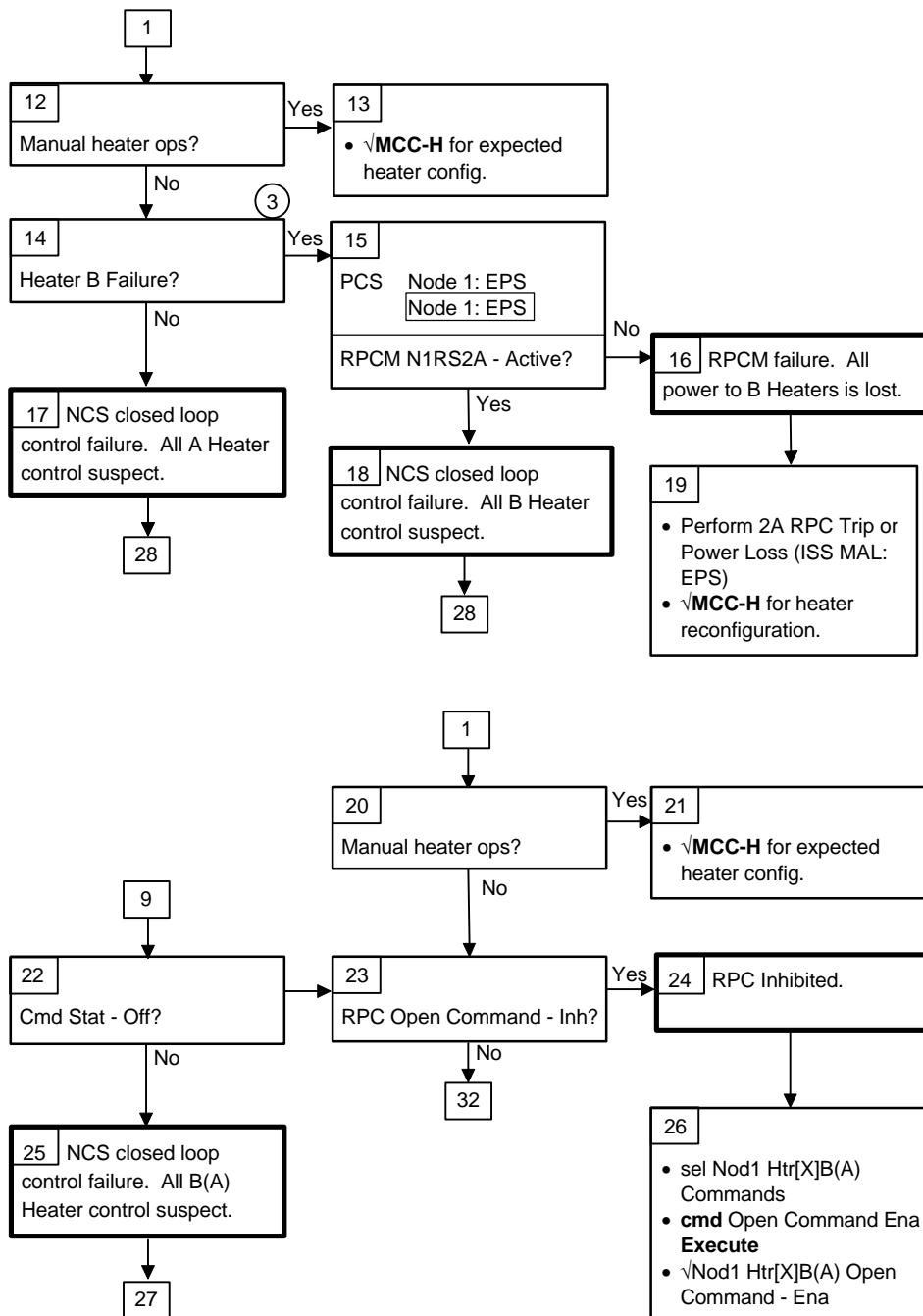
**TCS**

TCS

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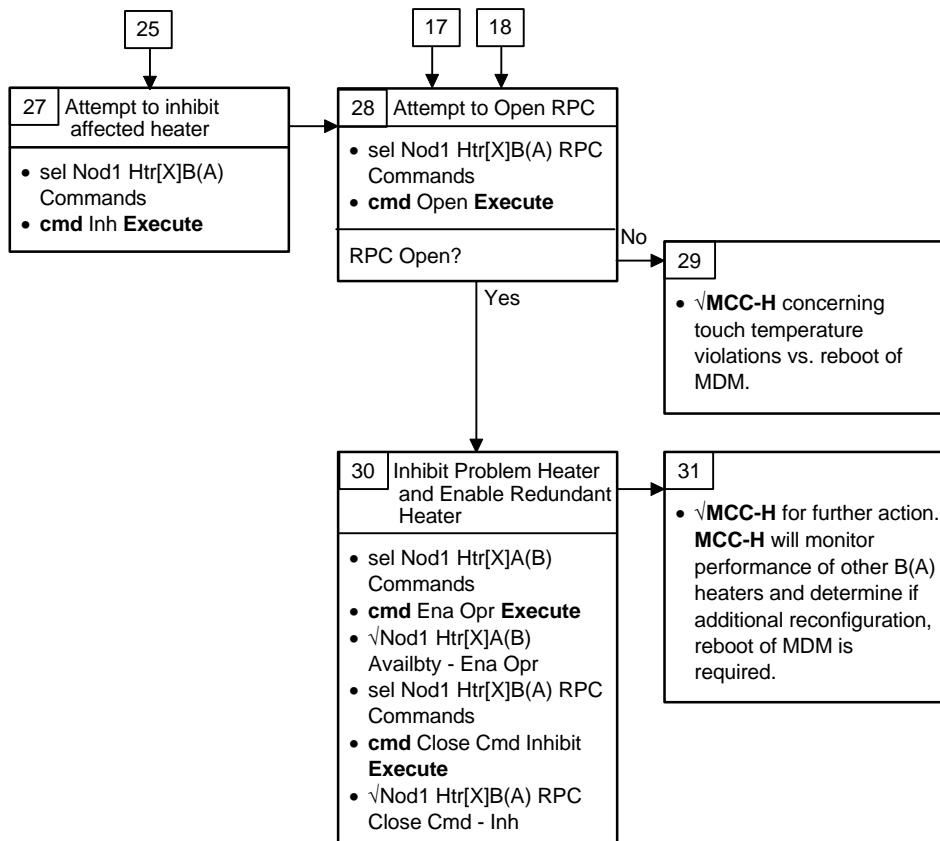
## NODE 1 SHELL HEATER FAILURE (Cont)



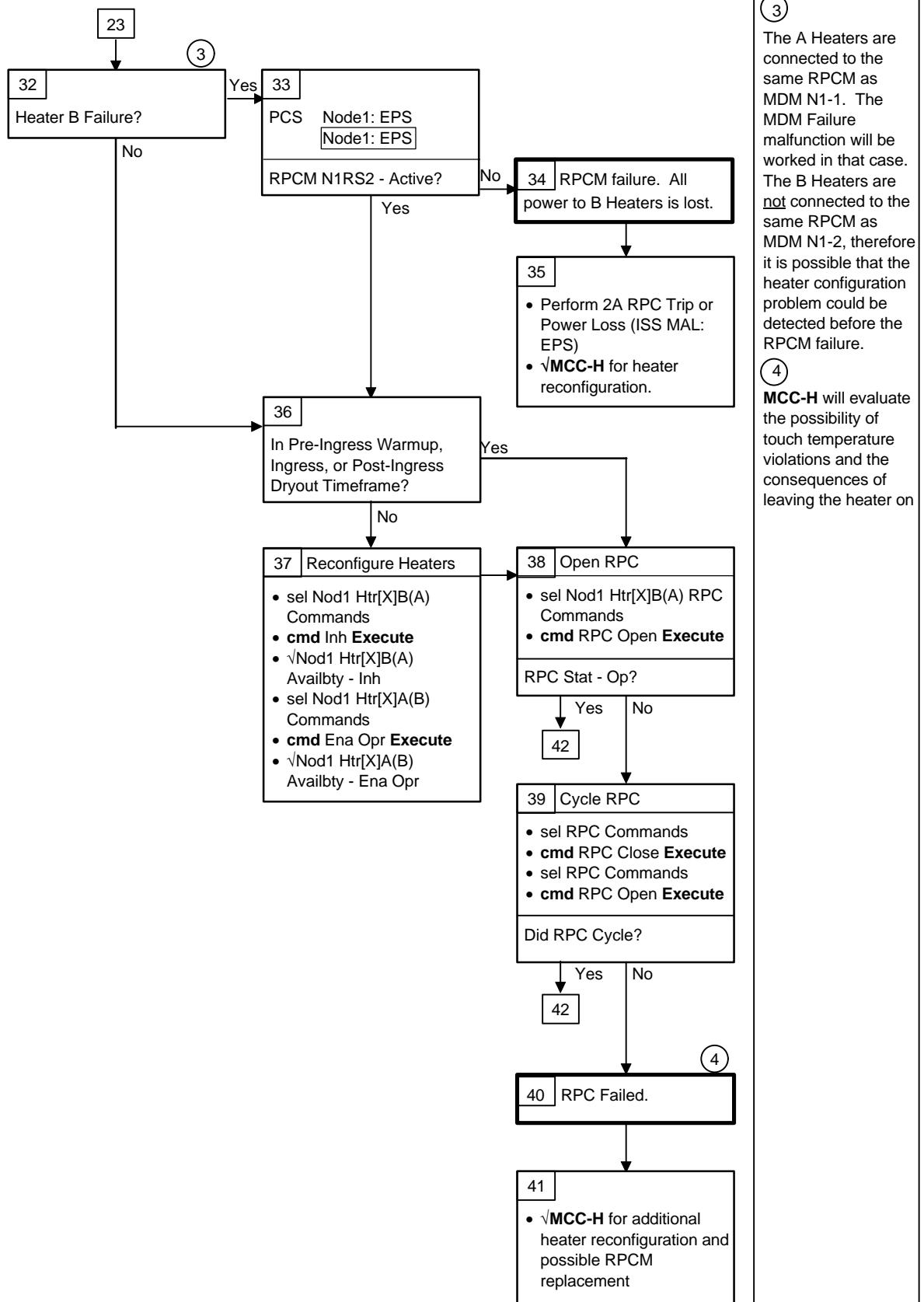
(3)

The A Heaters are connected to the same RPCM as MDM N1-1. The MDM Failure malfunction will be worked in that case. The B Heaters are not connected to the same RPCM as MDM N1-2, therefore it is possible that the heater configuration problem could be detected before the RPCM failure.

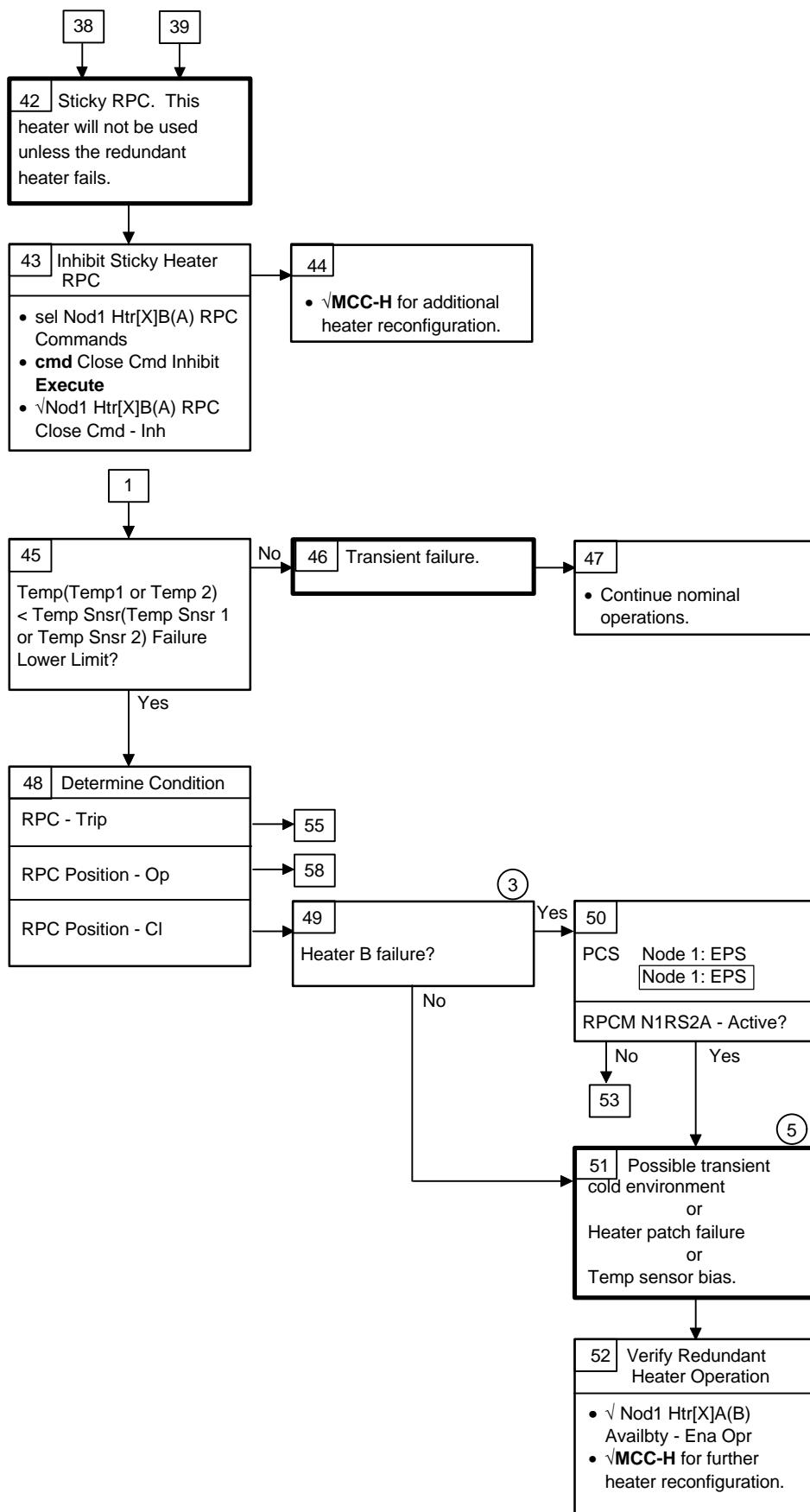
## NODE 1 SHELL HEATER FAILURE (Cont)



## NODE 1 SHELL HEATER FAILURE (Cont)



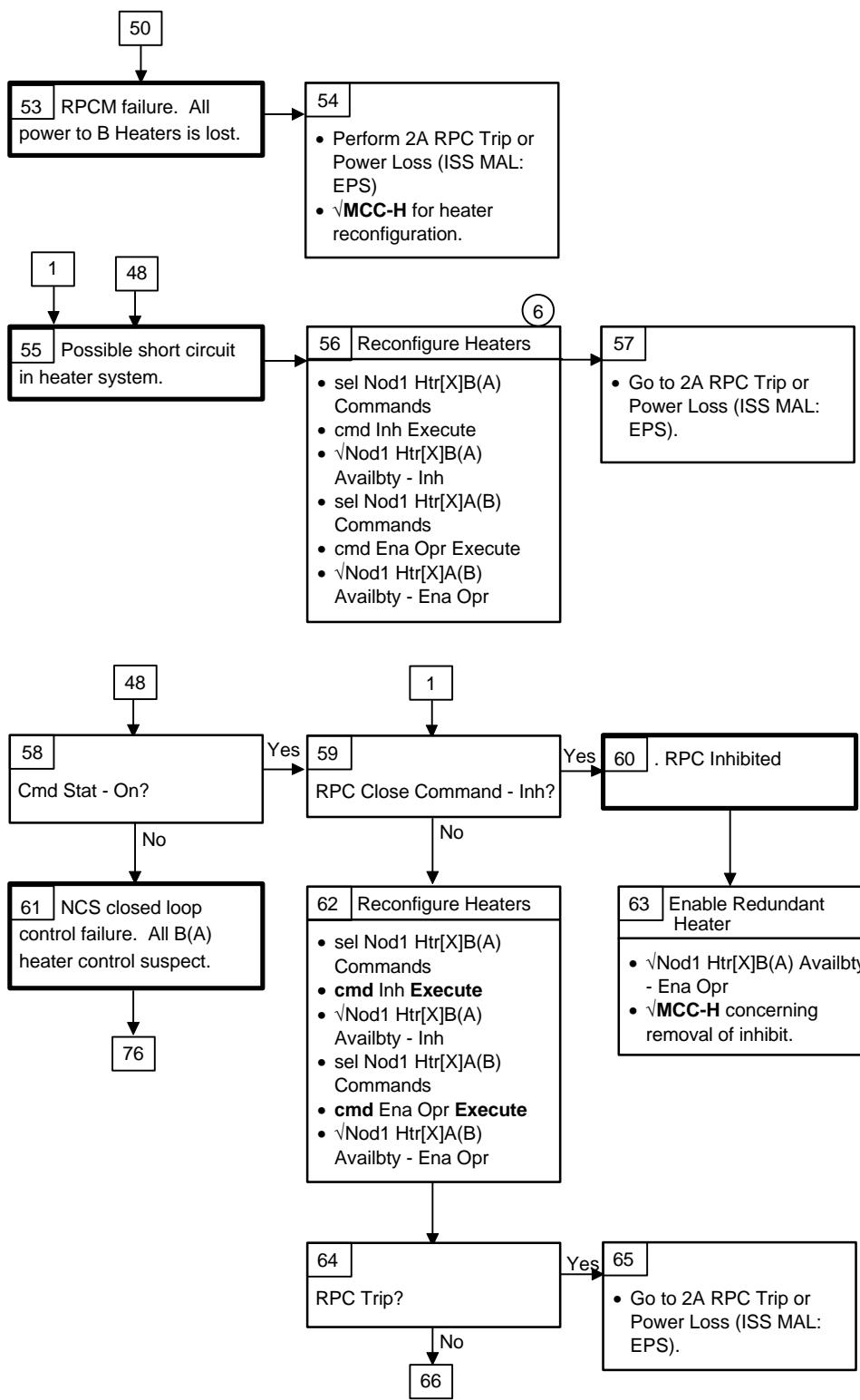
## NODE 1 SHELL HEATER FAILURE (Cont)



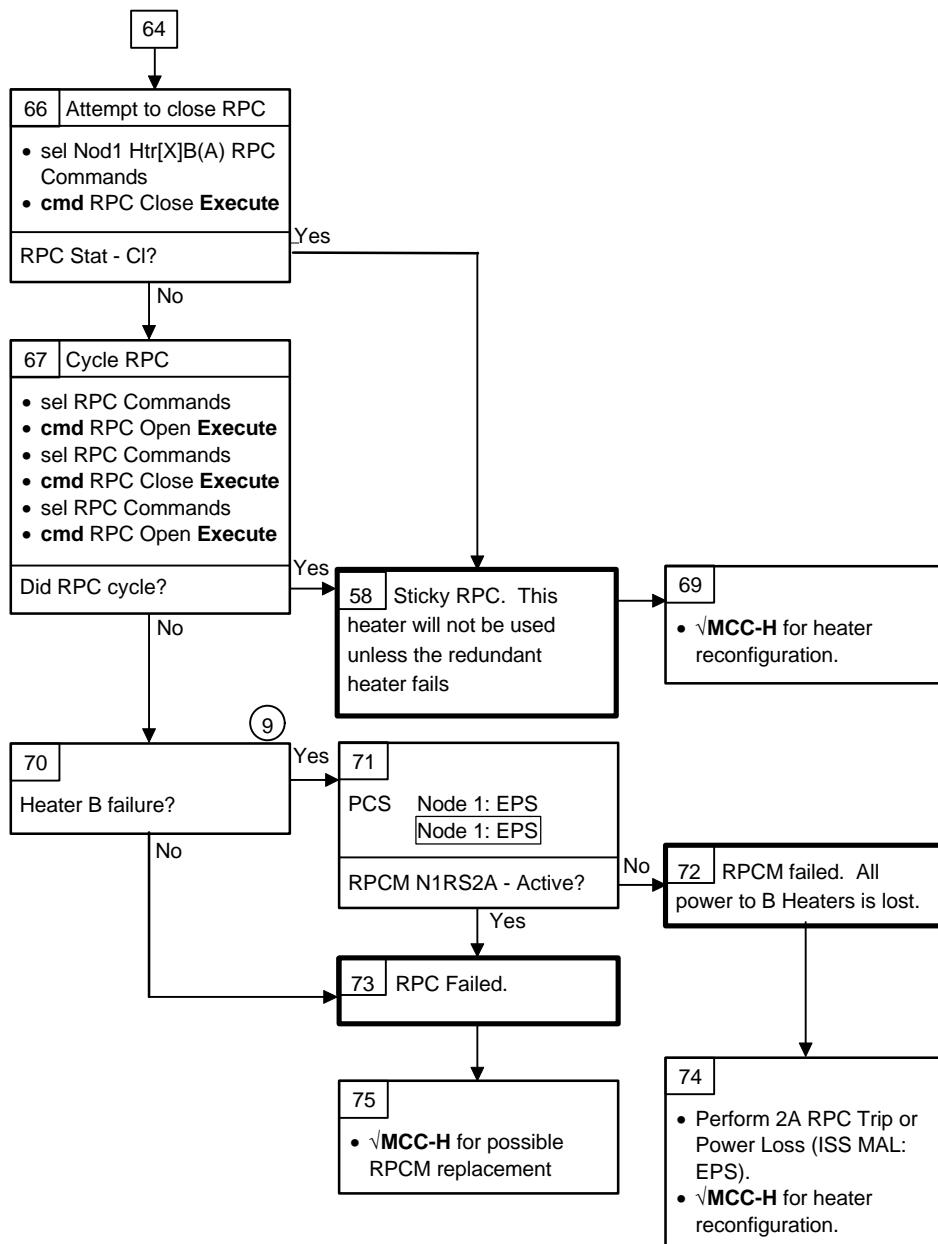
(3) The A Heaters are connected to the same RPCM as MDM N1-1. The MDM failure malfunction will be worked in that case. The B Heaters are not connected to the same RPCM as MDM N1-2, therefore it is possible that the heater configuration problem could be detected before the RPCM failure.

(5) A transient cold environment could require both B and A Heaters to keep temperatures within limits. A heater pad degonding failure or open circuit failure could also be the culprit in this case.

## NODE 1 SHELL HEATER FAILURE (Cont)



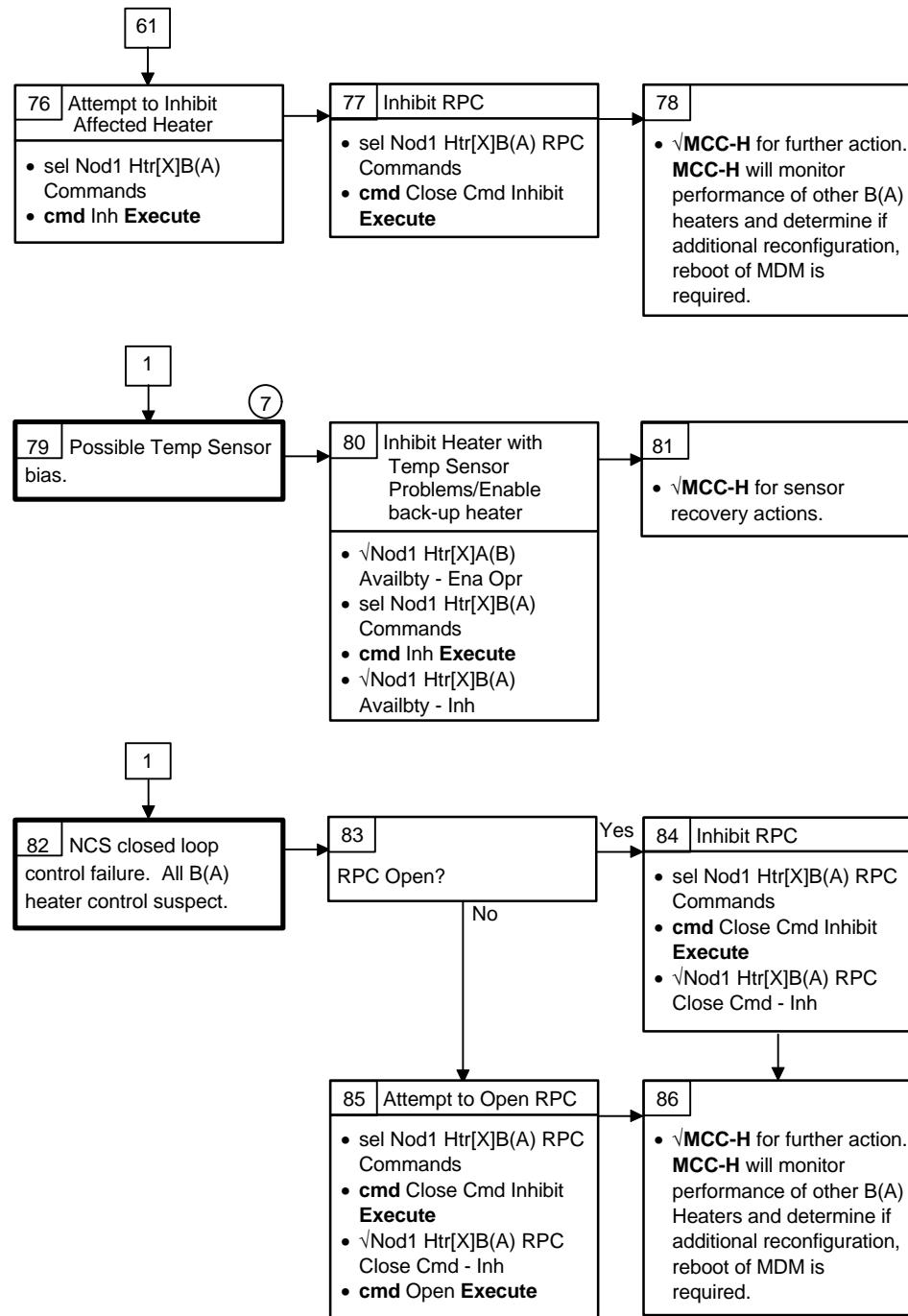
## NODE 1 SHELL HEATER FAILURE (Cont)



(3)

The A Heaters are connected to the same RPCM as MDM N1-1. The MDM failure malfunction will be worked in that case. The B Heaters are not connected to the same RPCM as MDM N1-2, therefore it is possible that the heater configuration problem could be detected before the RPCM failure.

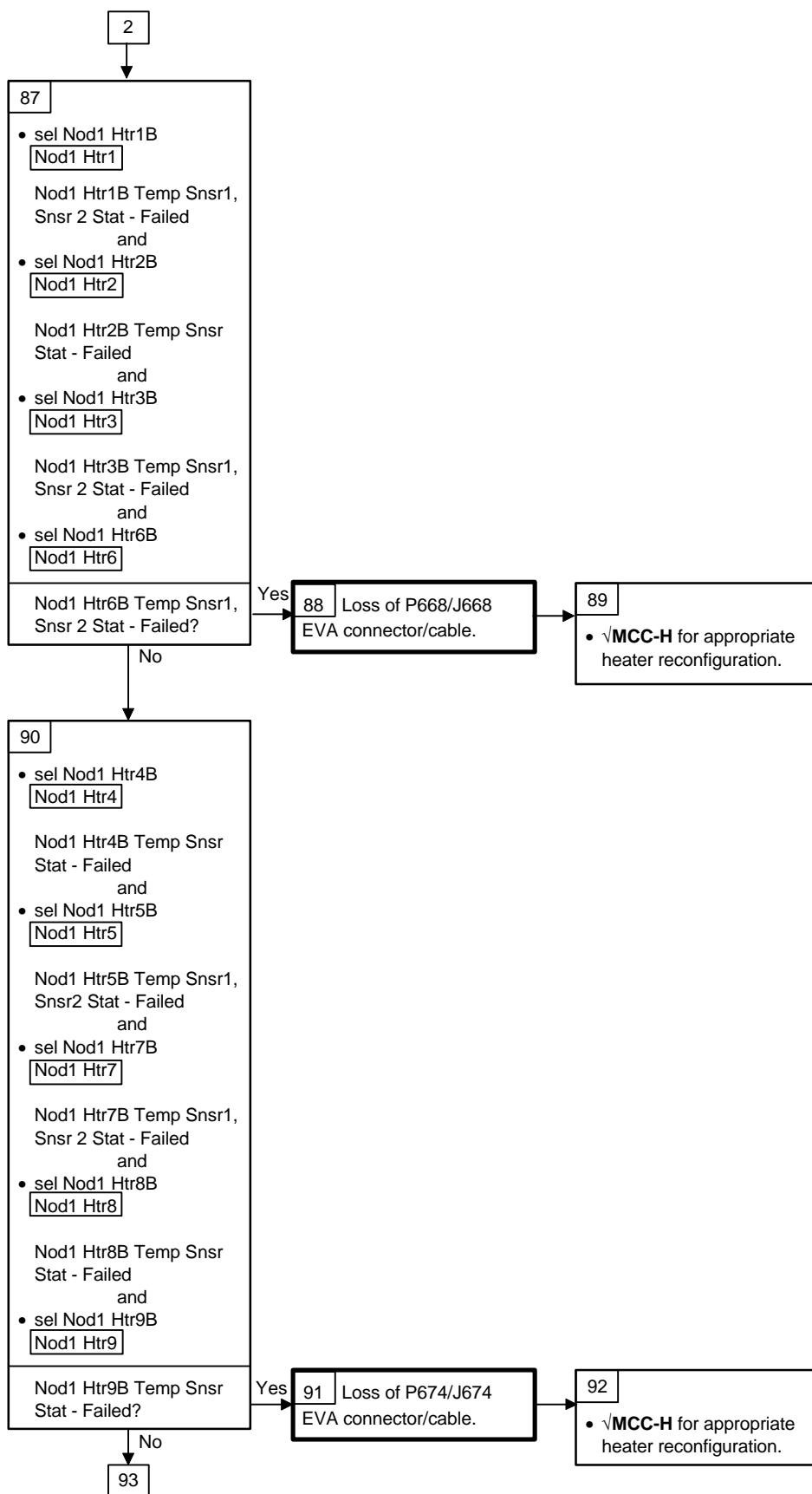
## NODE 1 SHELL HEATER FAILURE (Cont)



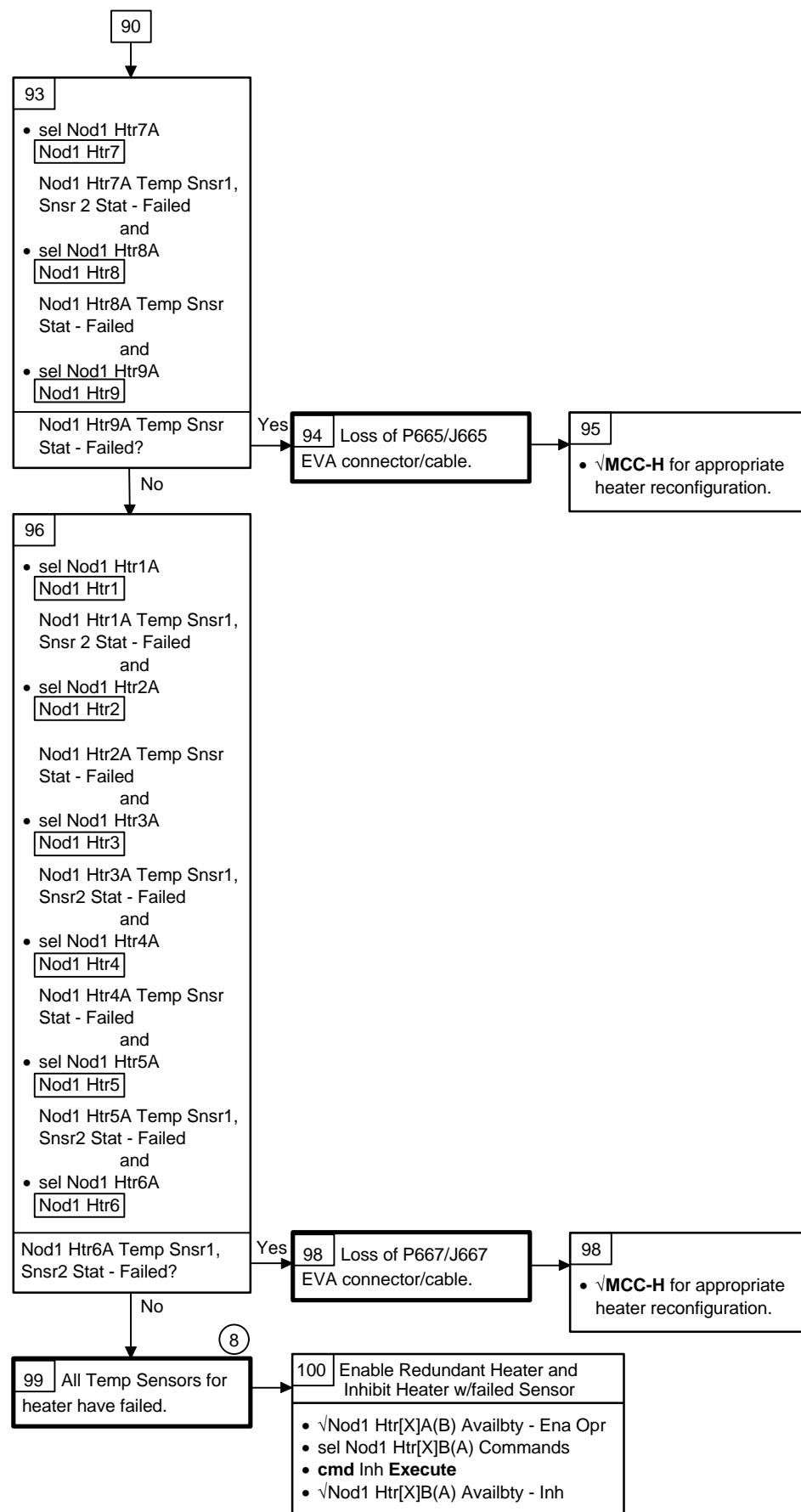
(7)

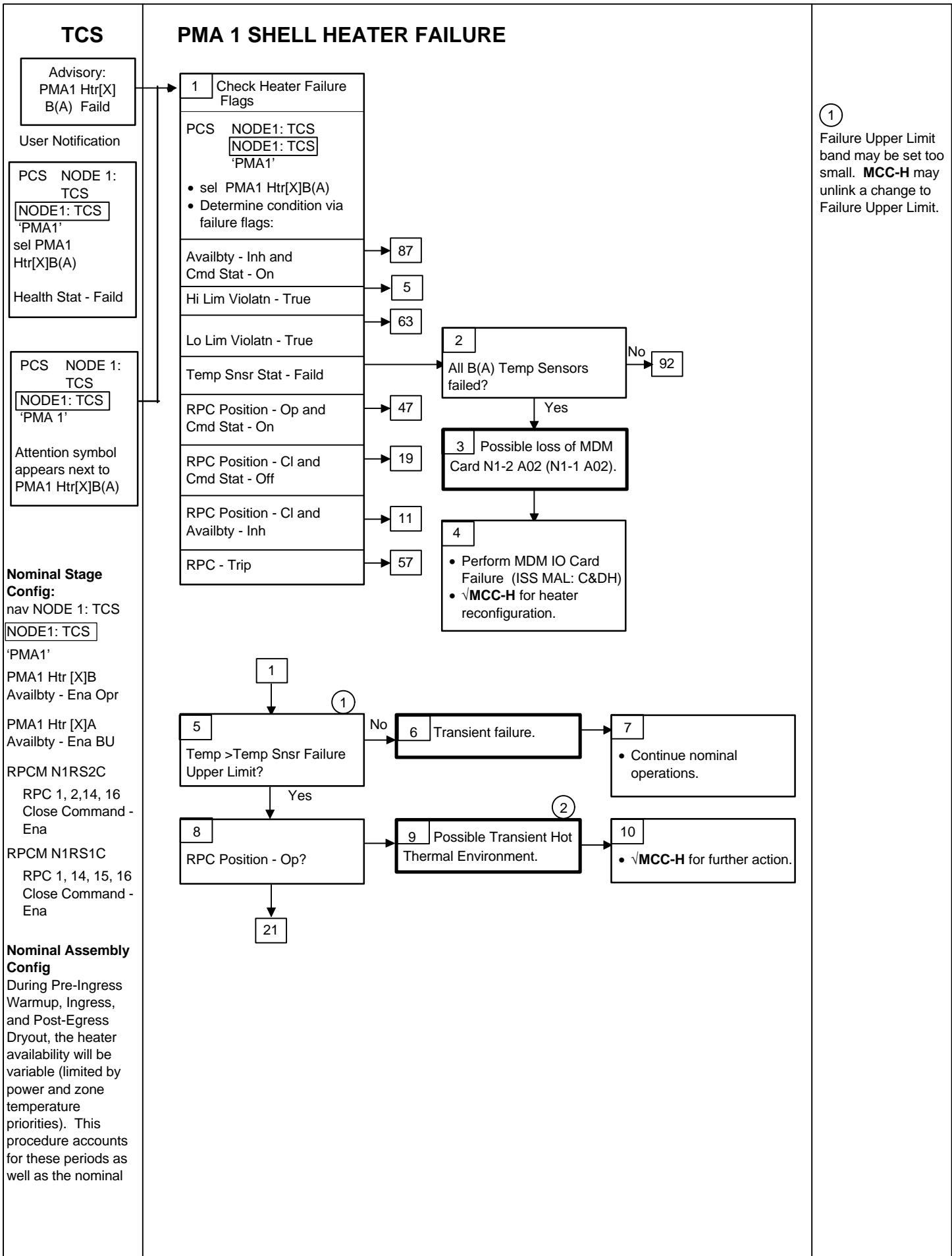
Temperature of one sensor is less than its lower setpoint, temperature of the redundant sensor is greater than its upper setpoint. Software will command the heater off (default state).

## NODE 1 SHELL HEATER FAILURE (Cont)

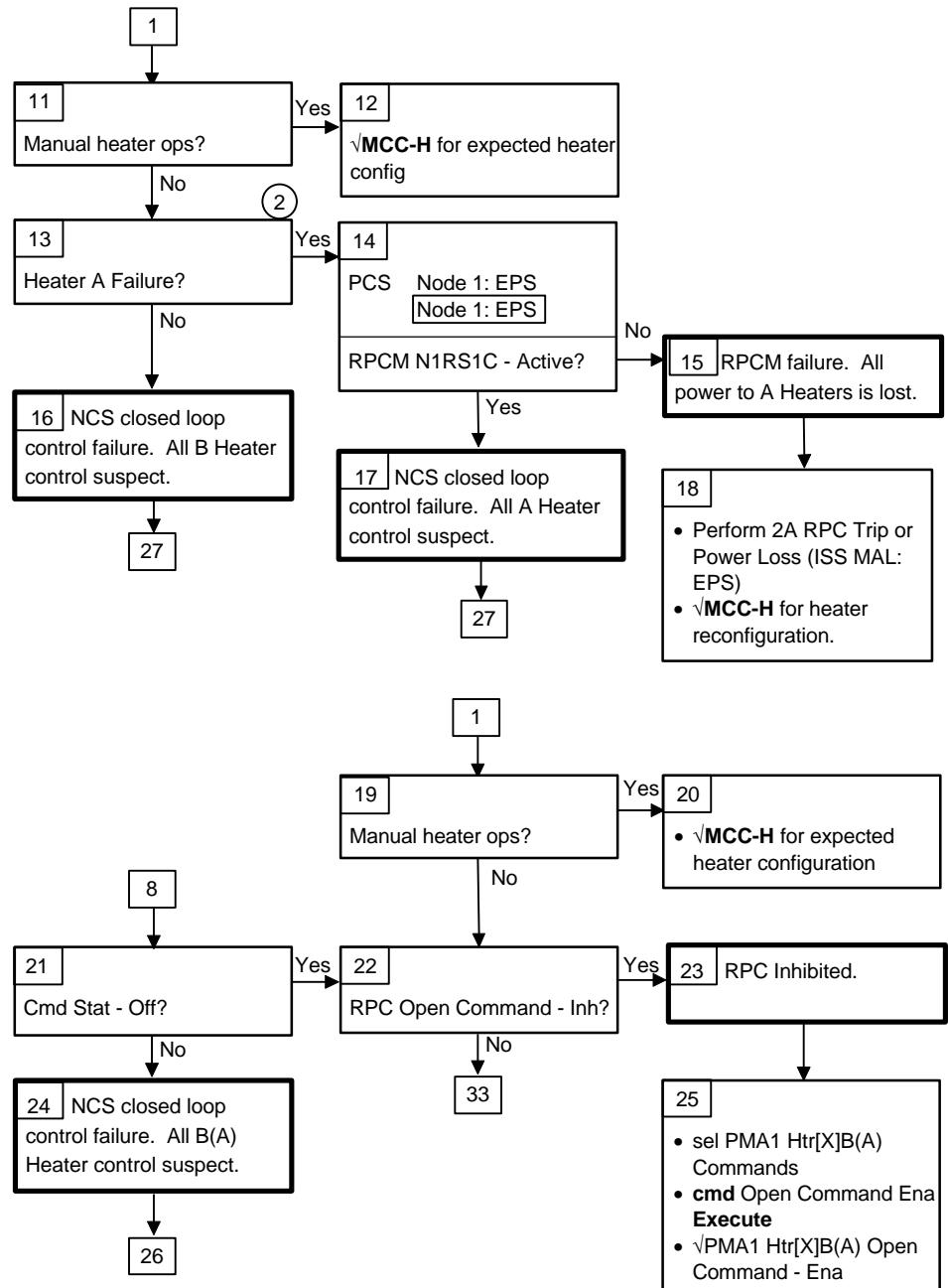


## NODE 1 SHELL HEATER FAILURE (Cont)





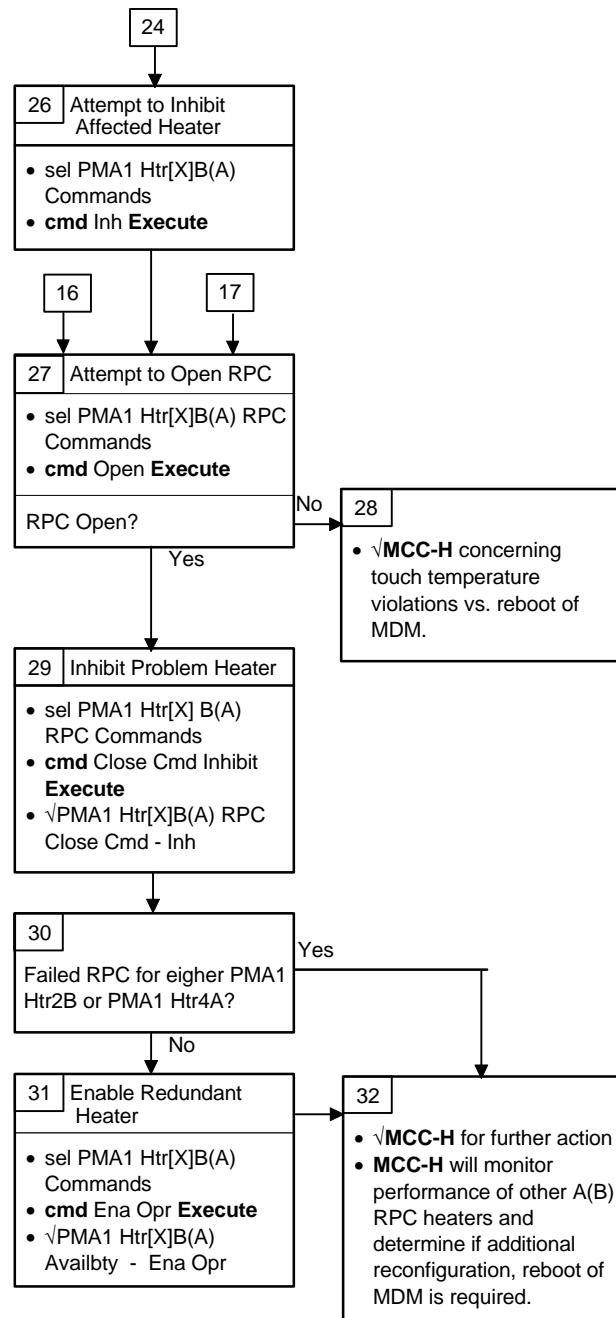
## PMA 1 SHELL HEATER FAILURE (Cont)



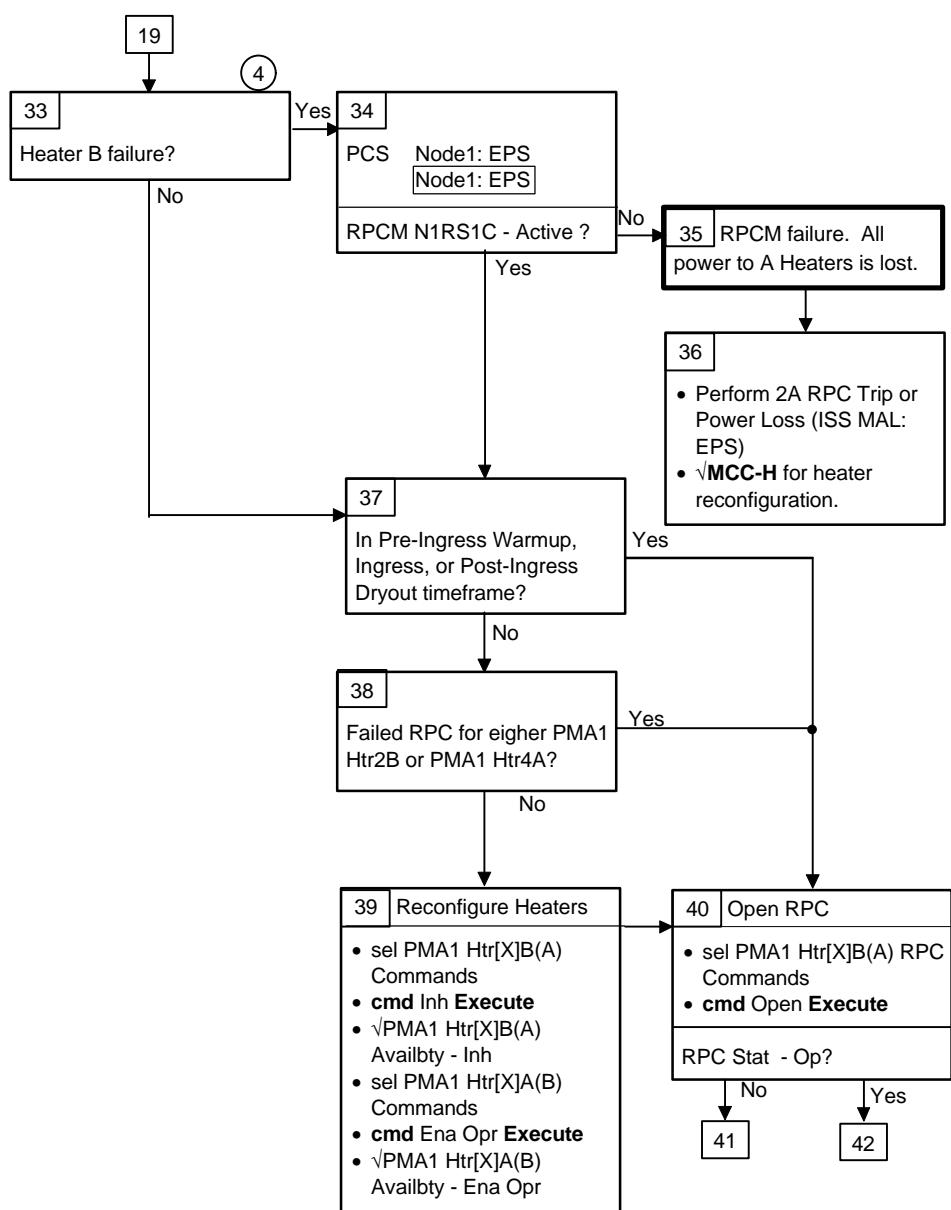
(2)

The A Heaters are connected to the same RPCM as MDM N1-1. The MDM Failure malfunction will be worked in that case. The B Heaters are not connected to the same RPCM as MDM N1-2, therefore it is possible that the heater configuration problem could be detected before the RPCM failure.

## PMA 1 SHELL HEATER FAILURE (Cont)

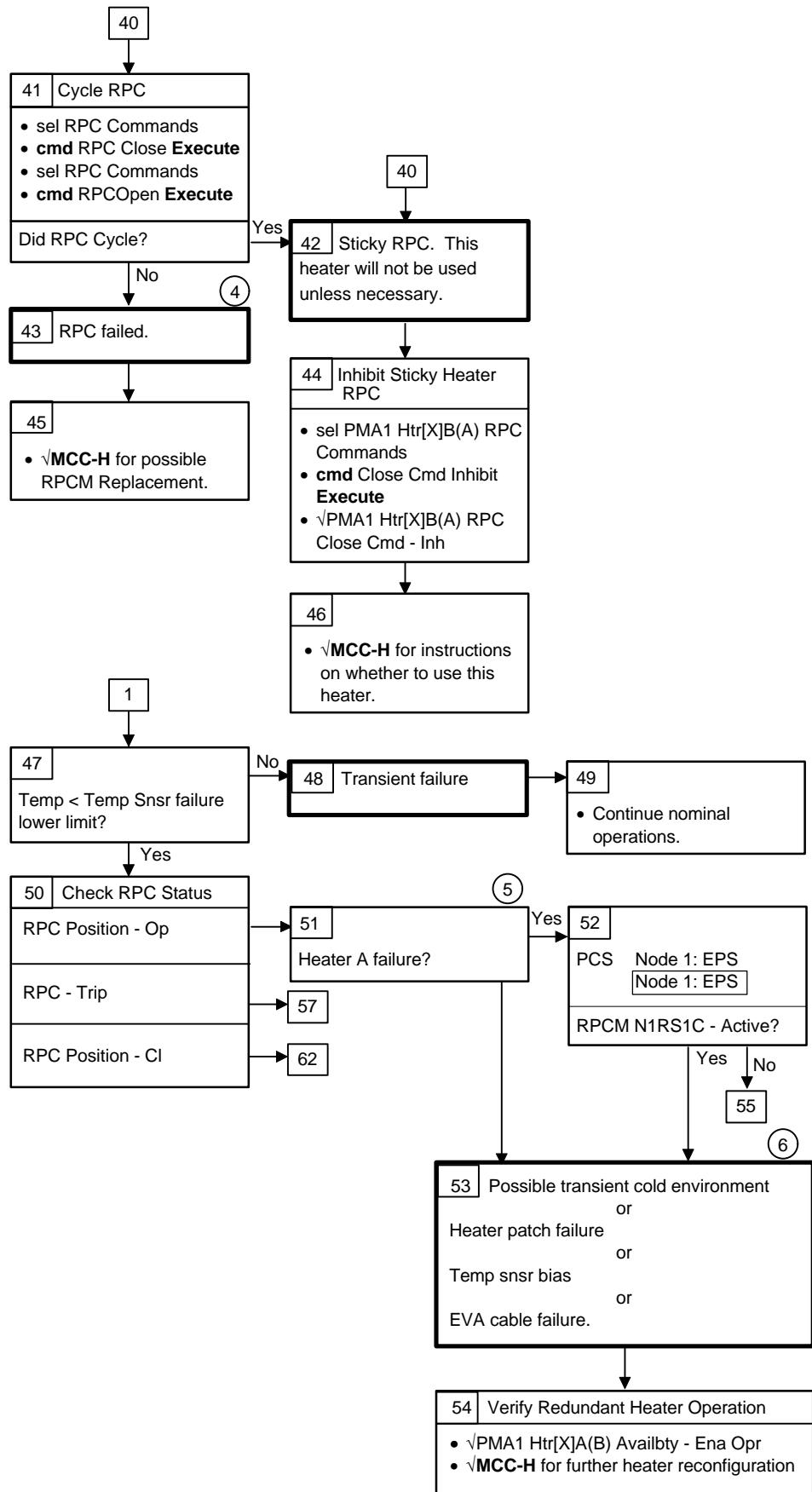


## PMA 1 SHELL HEATER FAILURE (Cont)



(4) The B Heaters are connected to the same RPCM as MDM N1-2. The MDM Failure malfunction will be worked in that case. The A heaters are not connected to the same RPCM as MDM N1-1; therefore, it is possible that the heater configuration problem could be detected before the RPCM failure.

## PMA 1 SHELL HEATER FAILURE (Cont)

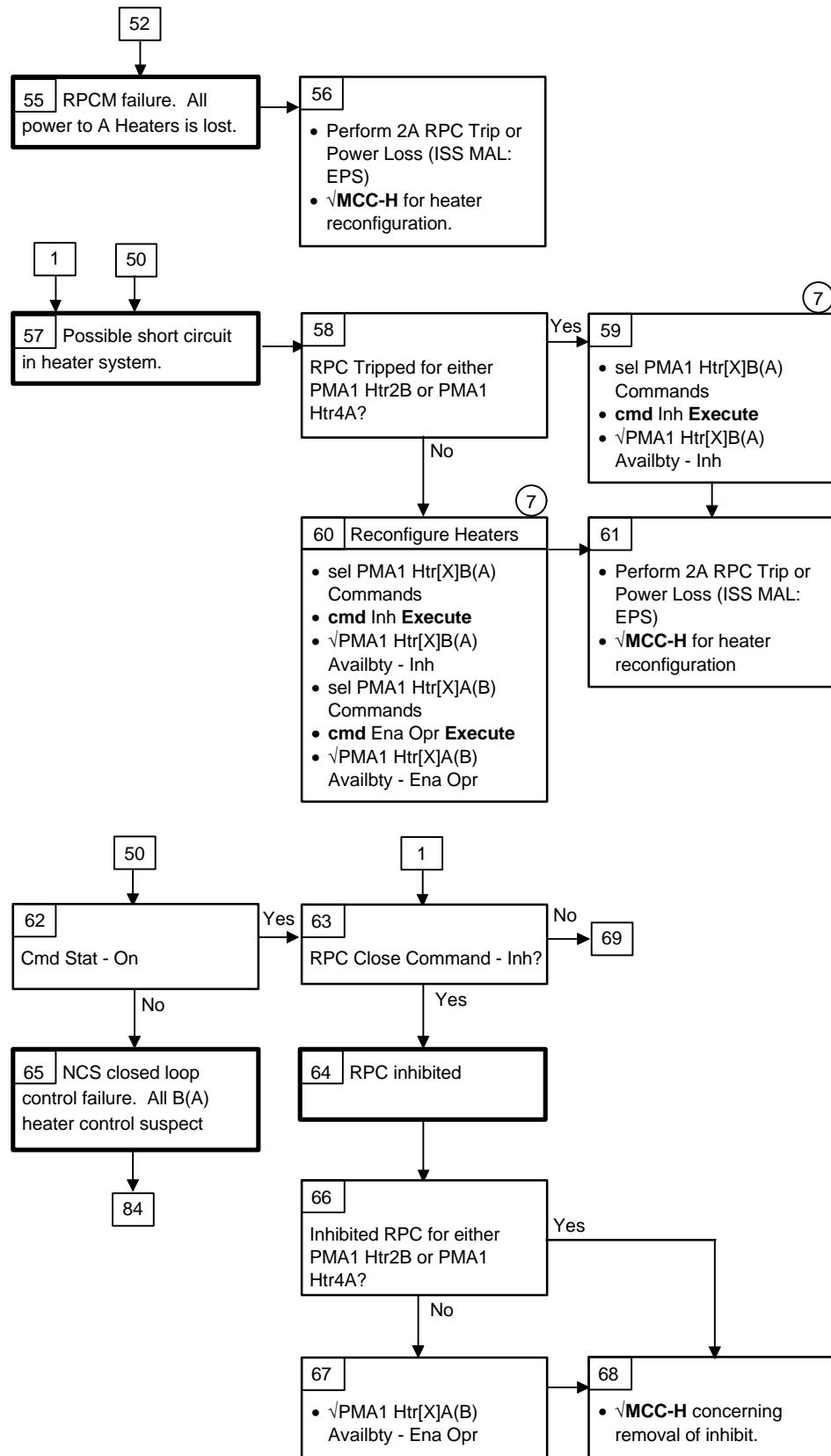


(4) MCC-H will evaluate the possibility of touch temperature violations and consequences of leaving the heater on.

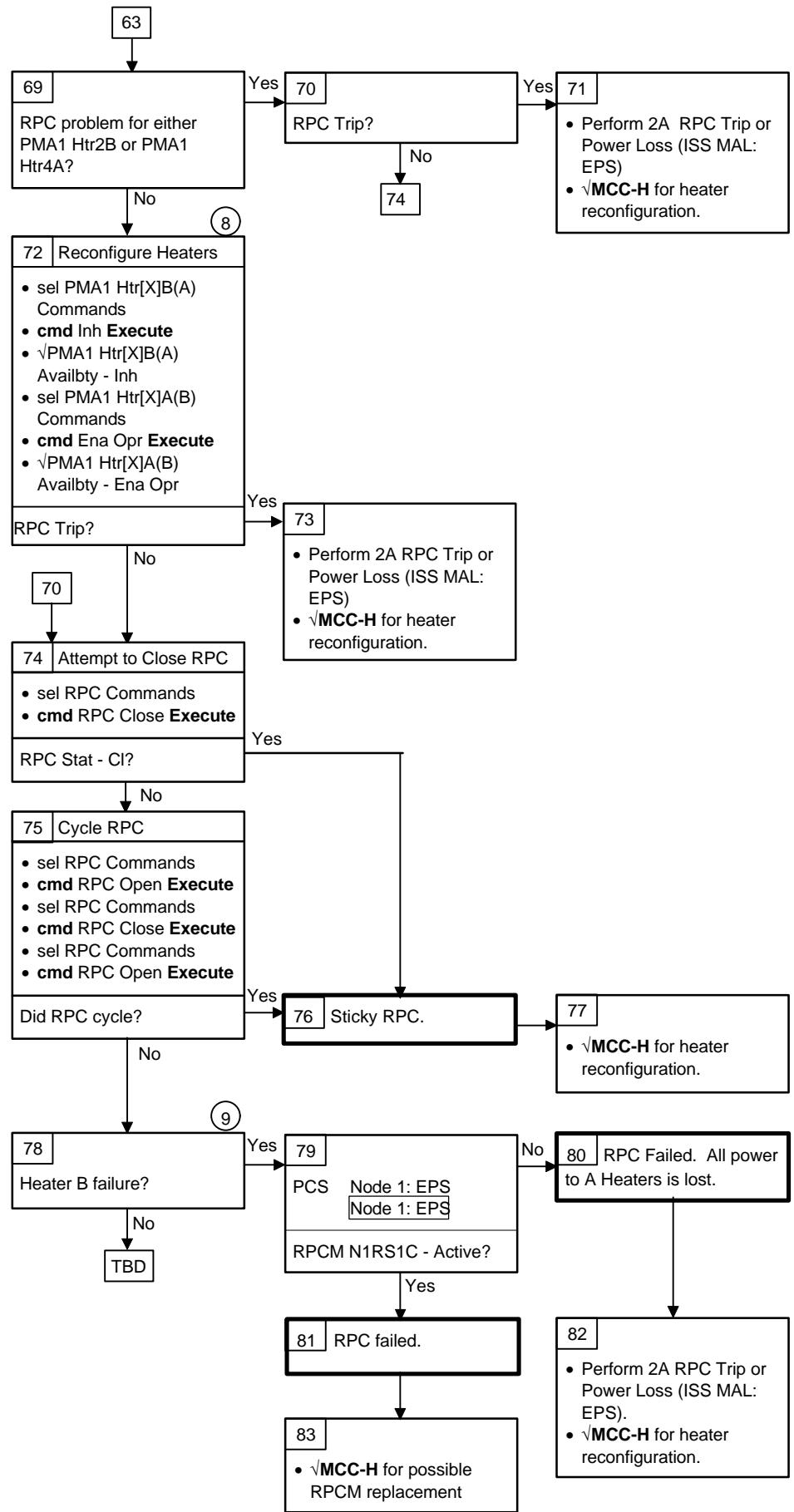
(5) The B Heaters are connected to the same RPCM as MDM N1-2. The MDM failure malfunction will be worked in that case. The A Heaters are not connected to the same RPCM as MDM N1-2; therefore, it is possible that the heater configuration problem could be detected before the RPCM failure.

(6) A transient cold environment could require both B and A heaters to keep temperatures within limits. A heater pad debonding failure could also be the culprit in this case. If all B(A) temperatures do not appear to be rising properly, the failure could be in the EVA cable/connectors P672/J672 (B Heaters) or P666/J666 (A Heaters).

## PMA 1 SHELL HEATER FAILURE (Cont)



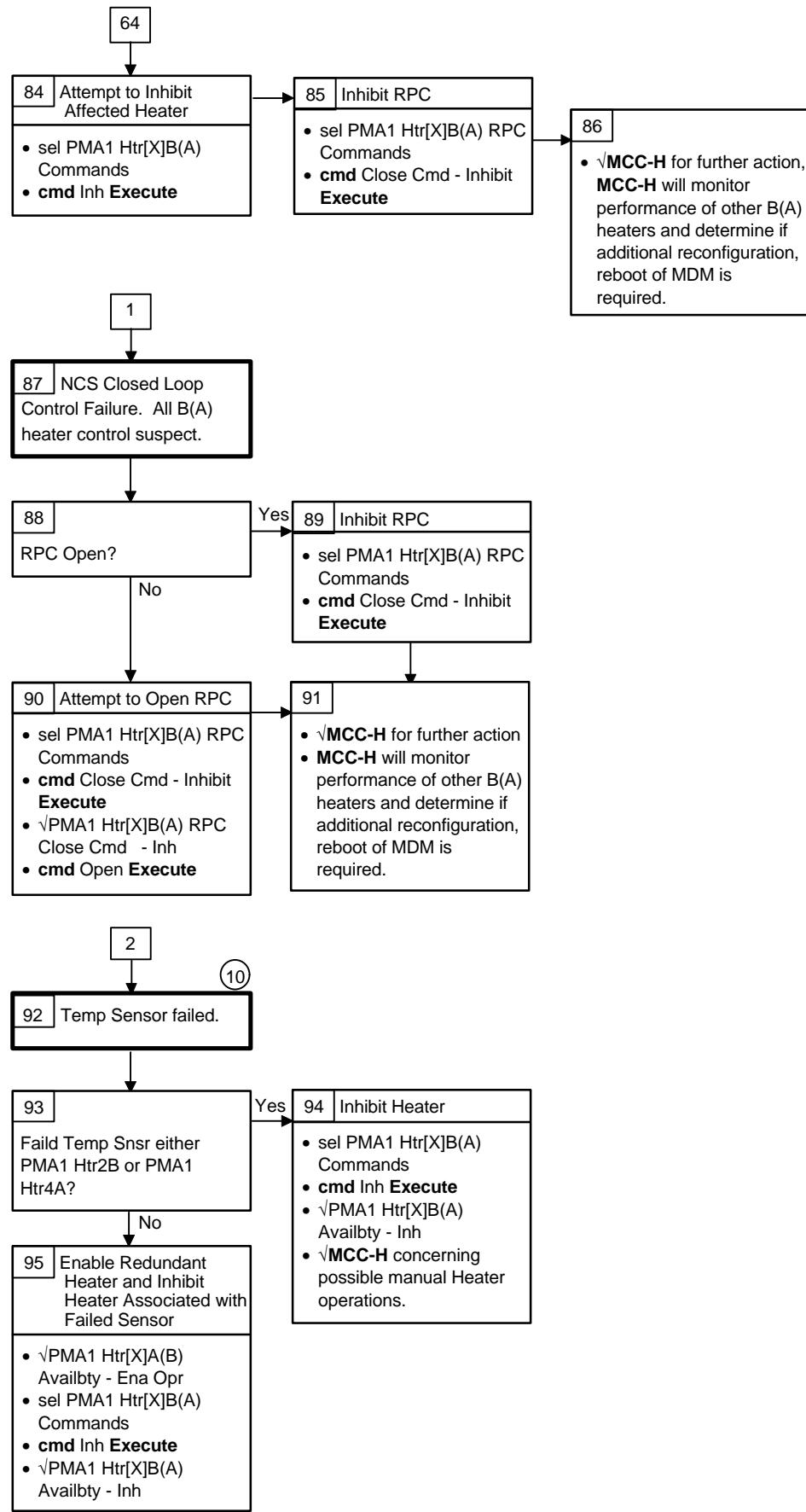
## PMA 1 SHELL HEATER FAILURE (Cont)



Since the shell is in a cold condition, the back-up heater should be enabled.

The B Heaters are connected to the same RPCM as MDM N1-2. The MDM failure malfunction will be worked in that case. The A Heaters are not connected to the same RPCM as MDM N1-1; therefore, it is possible that the heater configuration problem could be detected before the RPCM failure.

## PMA 1 SHELL HEATER FAILURE (Cont)



CORRECTIVE PROCEDURESA&C

RACU JUMPER RECONFIGURATION..... 2-5

L&M

HATCH R&R .....	2-21
RPCM R&R NOD1D1.....	2-25
RPCM R&R NOD1O1 .....	2-29
PRESSURE WALL REPAIR .....	TBD
IMV FAN R&R NODE 1.....	2-34

TCS

NODE 1/PMA 1 MANUAL HEATER OPERATIONS..... 2-39

**CORRECTIVE  
PROCEDURES**

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A&C PROCEDURES

RACU JUMPER RECONFIGURATION ..... 2-5

A&C

**A&C**

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## RACU JUMPER RECONFIGURATION

### NOTE

Verify PCS configured for both MDMs.

- PCS 1. VERIFY PMA1 AND NODE1 A AND B HEATERS' CONFIGURATION

Node 1: TCS

**Node 1: TCS**

'PMA 1'

✓PMA1 Htr A (four) - Inh

✓B (four) - Ena\_Opr

'NODE 1'

✓NOD1 Htr A (nine) - Inh

✓B (nine) - Ena\_Opr

- PCS 2. INHIBIT NCS AUTORETRY

Node 1: C&DH: MDM N1-2

**Primary NCS MDM Node1**

'Software Control'

sel MDM Utilities

sel Commands

**cmd Prim\_NCS\_Inh\_NCS\_Retry Execute**

**Primary\_NCS\_MDM\_Utils**

✓Auto Retry Inhibit - X

3. COMMAND N1-1 TO DIAGNOSTIC

### NOTE

Expect PCS FDA 'CDH MDM N1-2 detected RT fail  
MDM N1-1 - PMA1'.

- PCS Node 1: C&DH: MDM N1-1

**Secondary NCS MDM Node1**

'MDM Major State'

sel Commands

**cmd N1\_1\_MDM\_Xsitn\_Dgnstc\_State\_Arm Execute**

**cmd N1\_1\_MDM\_Xsitn\_Dgnstc\_State Execute**

4. REMOVE N1-1 MDM POWER AT RPC  
'RPCM N1RS1 A'
- sel RPC 11  
sel Commands  
**cmd Open Execute**  
√Position - Op
- PCS 5. DISABLE RT DEVICES I/O ON EPS BUSES  
Node 1: C&DH: MDM N1-2  
Primary NCS MDM Node1
- sel UB EPS\_N1-14  
sel RT Status  
sel Inhib\_RT Commands
- PRIM\_NCS\_UB\_EPS\_N1\_14\_Inhib
- cmd Inhib\_RPCM\_N1RS1\_A Execute**  
**cmd B Execute**  
**cmd C Execute**
- RT\_Status
- √RT Inhibit 18, 19, 20 (three) - X

6. POWER DOWN RACU 6

NOTE

RACU commands sent from orbiter will not work  
if FGB relay matrix is in **MCC-M** command state.

CRT

**SM 204 FGB**

✓COMMANDING - INH

If COMMANDING - INH

RUSSIAN GROUND	<u>AOS</u>	<u>LOS</u>
Pass 1	____/____:____:____	____/____:____:____
Pass 2	____/____:____:____	____/____:____:____

Crew inform **MCC-H**: "Ready for RACU 6 power down"

**MCC-H** inform **MCC-M**: "Go for RACU 6 Power OFF"

**MCC-M** inform **MCC-H**: "RACU 6 Powered Off at \_\_\_\_/\_\_\_\_:\_\_\_\_ GMT"

If COMMANDING - ENA (crew commanding)

**MCC-M** inform **MCC-H**: "Go for RACU 6 Power OFF"

**MCC-H** inform crew: "Moscow GO for RACU 6 Power OFF"

**On MCC GO**

PCS

FGB: EPS: RACU Details

**RACU Details**

sel Commands

**cmd** RACU 6 - Off **Execute**

Crew inform **MCC-H**: "RACU 6 Power OFF at \_\_\_\_/\_\_\_\_:\_\_\_\_ GMT"

**On MCC GO** or when RACU 6 commanded OFF

PCS

FGB: EPS: RACU Details

**RACU Details**

✓RACU 6 Converter Off

✓Input Current < 2.0

✓Output Current 0.00

✓Voltage 0.00

Notify EVA crew: "RACU 6 OFF. Go for String 1 Jumper Reconfig"

NOTE

EV removes RACU 6 jumper and installs APCU  
2 jumper per EVA procedure.

7. VERIFY FGB POWER GENERATION STATUS  
On EV GO

PCS      FGB: EPSz  
          FGB: EPS

✓Main Bus Voltage 1,2 (two): 28.0 --- 29.0  
✓Battery Voltage 1-6 (six, along bottom) > 25.5

\*\*\*\*\*  
\* If any Battery Voltage < 25.5 V \*  
\* Notify **MCC**: FGB Batteries Low. \*  
\* Wait 1 rev for FGB battery charge. \*  
\*\*\*\*\*

8. COMMAND RACU 6 ON

CRT      SM 204 FGB

✓COMMANDING - INH

If COMMANDING - INH

RUSSIAN GROUND	AOS	LOS
Pass 1	____ / ____ : ____	____ / ____ : ____
Pass 2	____ / ____ : ____	____ / ____ : ____

Crew inform **MCC-H**: "Ready for RACU 6 Power ON"

**MCC-H** inform **MCC-M**: "Go for RACU 6 Power ON"

**MCC-M** inform **MCC-H** inform crew: "RACU 6 Power ON at \_\_\_\_ / \_\_\_\_ : \_\_\_\_ "

If COMMANDING - ENA (crew commanding)

Crew inform **MCC-H**: "Ready for RACU 6 Power ON"

**MCC-M** inform **MCC-H**: "Go for RACU 6 Power ON"

**MCC-H** inform crew: "Moscow Go for RACU 6 Power ON"

**On MCC GO**

PCS      FGB: EPS: RACU Details  
          RACU Details

sel Commands  
**cmd** RACU 6 - On **Execute**

✓RACU 6 Converter On  
✓Input Current > 2.0  
✓Output Current > 0.3  
✓Voltage: 121 --- 125

Crew inform **MCC-H**: "RACU 6 Power On at \_\_\_\_/\_\_\_\_:\_\_\_\_ GMT"

```
*****
* If Output Current > 10 Amps      *
* sel Commands                    *
* cmd RACU 6 - OFF Execute     *
* √MCC-H                         *
*****
```

9. VERIFY N1-1 TRANSITION TO STANDBY

NOTE

MDM may take up to 5 minutes to warm-up  
and go through POST.

PCS      Node 1: C&DH: MDM N1-1  
          Secondary NCS MDM Node1  
          'MDM Major State'  
  
          √State - Standby

10. COMMAND N1-1 MDM TO SECONDARY  
'MDM Major State'

sel Commands  
**cmd N1\_1\_MDM\_Xsitn\_Second\_State Execute**  
√State - Secondary

11. ENABLE RT DEVICES I/O ON EPS BUSES

```
*****
* If N1-2 power down will be delayed      *
* Node 1: C&DH: MDM N1-2                  *
* 'Software Control'                      *
*                                         *
* sel MDM Utilities                      *
* sel Commands                          *
* cmd Prim_NCS_Ena_NCS_Retry Execute   *
*                                         *
* Primary_NCS_MDM_Utils                 *
*                                         *
* √Auto Retry Inhibit - <blank>        *
*****
```

PCS      Node 1: C&DH: MDM N1-2  
          Primary NCS MDM Node1  
  
          sel UB EPS N1 14  
          sel RT Status  
          sel Ena\_RT Commands

Prim\_NCS\_UB\_EPS\_N1\_14\_Ena

**cmd** Ena\_RPCM\_N1RS1\_A **Execute**  
**cmd** \_\_\_\_\_ B **Execute**  
**cmd** \_\_\_\_\_ C **Execute**

RT\_Status

✓RT Inhibited 18, 19, 20 (three) - <blank>

PCS 12. PROVIDE POWER TO MDM SDO CARD

Node 1: C&DH: MDM N1-1

Secondary NCS MDM Node1

'RPCM N1RS1 A'

sel RPC 5  
sel Commands  
**cmd** Close **Execute**  
✓Position - CI

PCS 13. INHIBIT PMA1 B HEATERS AND PMA HEATER RPCS

Node 1: TCS

Node1: TCS

'PMA1'

sel PMA1 Htr[X]B [X] =

sel Htr Commands (right side)  
**cmd** Inh **Execute**  
✓PMA1 Htr[X]B Availbty - Inh

sel RPC Commands (right side)  
**cmd** Close Cmd - Inhibit **Execute**  
✓Close Cmd - Inh

Repeat

PCS 14. INHIBIT NODE 1 B HEATERS AND NODE 1 HEATER RPCS

Node 1: TCS

Node1: TCS

'NODE 1'

- sel Nod1 Htr[X]B [X] = 1 2 3 4 5 6 7 8 9
- sel Htr Commands (right side)  
**cmd** Inh **Execute**  
 √Nod1 Htr[X]B Availbty - Inh
- sel RPC Commands (right side)  
**cmd** Close Cmd - Inhibit **Execute**  
 √Close Cmd - Inh
- Repeat
- PCS      15. INHIBIT NCS AUTO RETRY  
 Node 1: C&DH: MDM N1-1  
Secondary NCS MDM Node1  
 'Software Control'
- sel MDM Utilities  
 sel Commands  
**cmd** Second\_NCS\_Inh\_NCS\_Retry **Execute**
- Secondary\_NCS\_MDM\_Utils
- √Auto Retry Inh - X
- PCS      16. COMMAND N1-2 TO DIAGNOSTICS
- On MCC GO
- NOTE

  1. Expect PCS to lose connection with MDM.
  2. Possible PDI DECOM Fail message.
- PCS      Node 1: C&DH: MDM N1-2  
Primary NCS MDM Node1  
 'MDM Major State'
- sel Commands  
**cmd** N1\_2\_MDM\_Xsitn\_Dgnstc\_State\_ARM **Execute**  
**cmd** N1\_2\_MDM\_Xsitn\_Dgnstc\_State **Execute**
- CRT      17. TELEMETRY RECOVERY ON AND OIU
- SM 212 OIU
- BUS 4 BC - ITEM 15 EXEC (\*)  
 BUS 3 RT - ITEM 10 EXEC (\*)  
 Change OIU N1 Phys Dev to N1-1 - ITEM 18 +4 EXEC

Wait 1 minute from diagnostic command.

NOTE

Possible PDI DECOM Fail message.

CRT      Reload OIU FORMAT 2 - ITEM 1 +2 EXEC

18. TELEMETRY RECOVERY ON PCS

NOTE

Expect PCS FDA 'CDH MDM N1-1 detected RT fail  
MDM N1-2 - PMA1'.

PCS      On PCS attached to PDIP N1-1 port  
sel arrow above 'PCS' logo  
sel Start/Restart PCS CDS  
sel icon to open PCS CDS Main Control Panel Window and enlarge  
(may be buried behind displays)  
√Status box - yellow  
  
sel 'Connect to MDM'  
  
√Status box - green  
Verify 'connected to MDM' indicated  
  
If displays not loaded  
sel arrow above 'PCS' logo  
sel Start PCS CDDF display  
  
Home page will display when load complete (~1 minute)

PCS      Node 1: C&DH: MDM N1-1  
[Primary NCS MDM Node1]  
'MDM Major State'

√State - Primary

\*\*\*\*\*  
\* If State not Primary or no N1-1 TLM \*  
\* √MCC-H \*  
\*\*\*\*\*

#### **19. REMOVE N1-2 MDM POWER AT RPC**

## NOTE

Expect PCS FDA (LED and message only) when MDM power removed.

PCS Node 1: C&DH: MDM N1-2  
Secondary NCS MDM Node1  
'RPCM N1RS2 C'

sel    RPC 13  
sel    Commands  
**cmd** Open **Execute**  
√Position - Op

## 20. DISABLE RT DEVICES I/O ON EPS BUSES

PCS            Node 1: C&DH: MDM N1-1  
                Primary NCS MDM Node1  
                sel UB EPS N1 23  
                sel RT Status  
                sel Inhib RT Commands

**PRIM\_NCS\_UB\_EPS\_N1\_23\_Inhib**

<b>cmd</b>	Inhib_RPCM_N1RS2_A	<b>Execute</b>
<b>cmd</b>		<b>B Execute</b>
<b>cmd</b>		<b>C Execute</b>

## Prim\_EPS\_N1\_23\_RT\_Status

## $\sqrt{RT}$ Inhibited 18, 19, 20 (three) - X

**21. POWER DOWN RACU 5**

## **NOTE**

RACU commands sent from orbiter will not work if FGB relay matrix is in **MCC-M** command state.

CRT

## ✓COMMANDING - INH

If COMMANDING - INH

RUSSIAN GROUND	<u>AOS</u>	<u>LOS</u>
Pass 1	____/____:____	____/____:____
Pass 2	____/____:____	____/____:____

Crew inform **MCC-H**: "Ready for RACU 5 power down"

**MCC-H** inform **MCC-M**: "Go for RACU 5 Power OFF"

**MCC-M** inform **MCC-H**: "RACU 5 Powered OFF at \_\_\_\_/\_\_\_\_:\_\_\_\_ GMT"

If COMMANDING - ENA (crew commanding)

**MCC-M** inform **MCC-H**: "Go for RACU 5 Power OFF"

**MCC-H** inform crew: "Moscow Go for RACU 5 Power OFF"

**On MCC GO**

PCS

FGB: EPS: RACU Details

RACU Details

sel Commands

**cmd** RACU 5 - Off **Execute**

Crew inform **MCC-H**: "RACU 5 Power OFF at \_\_\_\_/\_\_\_\_:\_\_\_\_ GMT"

**On MCC GO or when RACU 5 commanded OFF**

PCS

FGB: EPS: RACU Details

RACU Details

✓RACU 5 Converter Off

✓Input Current < 2.0

✓Output Current 0.00

✓Voltage 0.00

IVA

Notify EVA crew: "RACU 5 OFF. Go for string 2 jumper reconfig"

NOTE

EV removes RACU 5 jumper and installs APCU 1  
jumper per EVA procedure.

22. VERIFY FGB POWER GENERATION STATUS

PCS On EV GO

FGB: EPS

**FGB:EPS**

✓Main Bus Voltage 1,2 (two): 28.0 --- 29.0

✓Battery Voltage 1-6 (six along bottom) > 25.5

\*\*\*\*\*

\* If any Battery Voltage < 25.5 V \*

\* Notify **MCC-H**: FGB Batteries Low. \*

\* Wait 1 rev for FGB battery charge. \*

\*\*\*\*\*

23. COMMAND RACU 5 ON

CRT

**SM 204 FGB**

✓COMMANDING - INH

If COMMANDING - INH

RUSSIAN GROUND	<u>AOS</u>	<u>LOS</u>
Pass 1	____ / ____ : ____	____ / ____ : ____
Pass 2	____ / ____ : ____	____ / ____ : ____

Crew inform **MCC-H**: "Ready for RACU 5 Power ON"

**MCC-H** inform **MCC-M**: "Go for RACU 5 Power ON"

**MCC-M** inform **MCC-H** inform crew: "RACU5 Power ON at  
\_\_\_\_ / \_\_\_\_ : \_\_\_\_ GMT"

If COMMANDING - ENA (crew commanding)

Crew inform **MCC-H**: "Ready for RACU 5 Power ON"

**MCC-M** inform **MCC-H**: "Go for RACU 5 Power ON"

**MCC-H** inform crew: "Moscow Go for RACU 5 Power ON"

**On MCC GO**

PCS

FGB: EPS: RACU Details

**RACU Details**

sel Commands

start timer at RACU 5 ON command

00:00:00

**cmd RACU 5 - On Execute**

√RACU 5 Converter On  
√Input Current > 2.0 A  
√Output Current > 0.3 A  
√Voltage: 121 --- 125 V

Crew inform **MCC-H**: "RACU 5 Power ON at \_\_\_\_/\_\_\_\_:\_\_\_\_"

```
*****
* If Output Current > 10 Amps      *
*   sel Commands                  *
*   cmd RACU 5 - OFF Execute   *
*   √MCC-H                         *
*****
```

24. VERIFY N1-2 IN STANDBY

PCS Node 1: C&DH: MDM N1-1  
[Primary NCS MDM Node1]  
'MDM Major State'

√State - Standby

```
*****
* If State not Standby,  *
*   √MCC-H                 *
*****
```

25. COMMAND N1-1 TO STANDBY

**NOTE**  
Expect PDI DECOM fail message.

PCS Node 1: C&DH: MDM N1-1  
[Primary NCS MDM Node1]  
'MDM Major State'

00:05:00 sel Commands  
**cmd Prim\_NCS\_Xsitn\_Stby\_State Execute**

26. TELEMETRY RECOVERY ON PCS AND OIU

CRT [SM 212 OIU]  
BUS 3 BC - ITEM 11 EXEC (\*)  
BUS 4 RT - ITEM 14 EXEC (\*)  
Change OIU N1 Phys Dev to N1-2 - ITEM 18 +3 EXEC

Wait 1 minute from command to standby.

**NOTE**  
Expect PDI DECOM Fail message.

Reload OIU FORMAT - ITEM 1 +2 EXEC

- PCS 27. **TELEMETRY RECOVERY ON PCS**  
On PCS attached to PDIP N1-2 port  
sel icon to open PCS CDS Main Control Panel Window  
√status box - yellow  
  
sel 'Connect to MDM'  
√status box - green  
Verify 'connected to MDM' indicated

PCS Node 1: C&DH: MDM N1-2  
Primary NCS MDM Node1  
'MDM Major State'  
  
√State - Primary

PCS 28. **COMMAND N1-1 MDM TO SECONDARY**  
Node 1: C&DH: MDM N1-1  
Secondary NCS MDM Node1  
'MDM Major State'  
  
**cmd N1\_1\_MDM\_Xstin\_Second\_State Execute**  
√State - Secondary

PCS 29. **ENABLE RT DEVICES I/O ON EPS BUSES**  
Node 1: C&DH: MDM N1-2  
Primary NCS MDM Node1  
  
sel UB EPS\_N1-23  
sel RT Status  
sel Ena\_RT Commands  
  
Prim\_NCS\_UB\_EPS\_N1\_23\_Ena  
  
**cmd Ena\_RPCM\_N1RS2\_A Execute**  
**cmd B Execute**  
**cmd C Execute**  
  
Prim\_EPS\_N1\_23\_RT\_Status  
  
√RT Inhibited 18, 19, 20 (three) - <blank>

30. **ENABLE NCS AUTO RETRY**  
Primary NCS MDM Node1  
'Software Control'  
  
sel MDM Utilities  
sel Commands  
**cmd Prim\_NCS\_Ena\_NCS\_Retry Execute**

**MDM Utilities**

✓Auto Retry Inh - <blank>

31. PROVIDE POWER TO MDM SDO CARD

**Primary NCS MDM Node1**

'RPCM N1RS2 C'

sel RPC 3  
sel Commands  
**cmd Close Execute**  
✓Position - CI

32. REACTIVATE EARLY COMM HEATERS

**NOTE**

The Early Comm equipment is powered by the  
Stbd CBM RPCs

PCS           Node 1: EPS: RPCM N1RS1 C  
**RPCM N1RS1 C**

sel RPC [X] [X] = **6** **13**  
sel Commands  
**cmd Close Execute**  
✓Position - CI  
Repeat

PCS           Node 1: EPS: RPCM N1RS2 A  
**RPCM N1RS2 A**

sel RPC 5  
sel Commands  
**cmd Close Execute**  
✓Position - CI

**NOTE**

The PMA1 and Node 1 Heater set points will be  
commanded by **MCC-H**.

## L&M PROCEDURES

HATCH R&R.....	2-21
RPCM R&R NOD1D1 .....	2-25
RPCM R&R NOD1O1 .....	2-29
PRESSURE WALL REPAIR .....	TBD
IMV FAN R&R NODE 1.....	2-34

L&M

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L&M

## HATCH R&R

### OBJECTIVE:

Remove and replace a defective Hatch.

### LOCATION:

Installed: U.S. Common Hatch

Stowed: ✓Maint Dbase

### DURATION:

110 minutes

### TOOLS REQUIRED:

IVA Tool Box Left Lid:

Plastic Feeler Gauges

Magnifying Glass (7X)

Kit A:

11/16" Combination Wrench

11/16" Crowfoot, 3/8" Drive

Kit D:

5/16" Hex Head, 3/8" Drive

Kit E:

Ratchet 3/8" Drive

Driver Handle 3/8" Drive

(30-200 in-lbs)Trq Wrench, 3/8" Drive

Kit F:

1/8" Hex Head Driver, 3/8" Drive

### REFERENCED PROCEDURE(S):

None

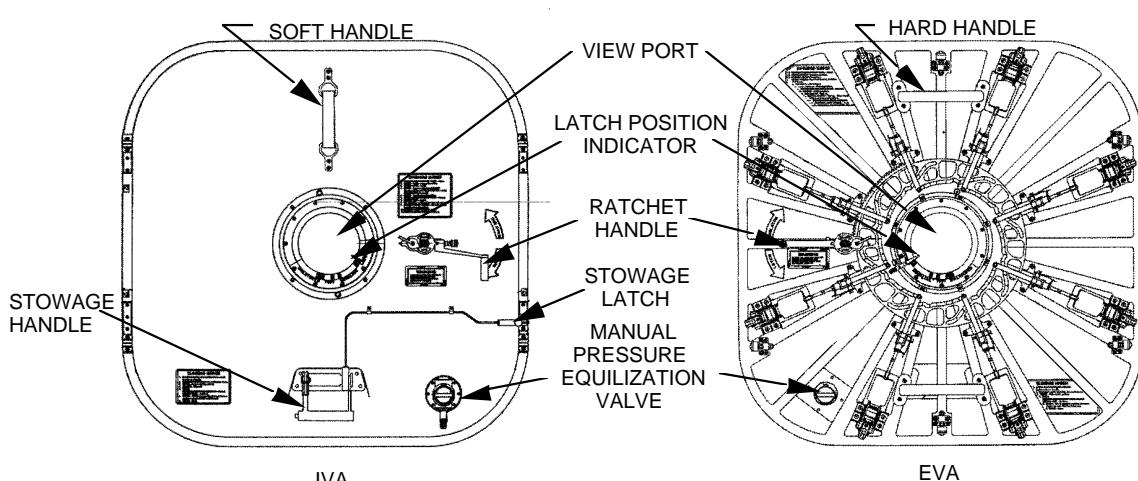


Figure 1.- Hatch Dome/Rib.

### REMOVE

1. Translate to rib side of Hatch.
2. Close Hatch, turn crank handle until pointer is at EQUALIZE position.
3. Loosen hatch latch set screws (eight) one full turn (Driver Handle 3/8" Drive, 1/8" Hex Head).
4. Open Hatch.
5. Translate to dome side of Hatch.
6. Close and latch Hatch.

#### NOTE

Six quick release pins are released from each radial track to allow for rotation. Four quick release pins are released from each axial track to allow for rotation.

7. Release disconnect grounding cables connecting tracks to bulkhead by using quick disconnect feature.
8. Release tethered quick release pins from Hatch track, rotate track out of way. Tmpy stow.

#### **CAUTION**

Two crew members are required to translate Hatch from stowed location.

9. Unlatch Hatch.
10. Remove Hatch from bulkhead.

### REPLACE

11. Orient replacement Hatch so that up arrow on soft handle assembly, located on dome side of Hatch, points in same direction the Hatch will travel up the tracks. Three arrow decals, also on dome side of Hatch, near rollers match three arrow decals on bulkhead.
12. Position and align replacement Hatch on bulkhead using alignment guides as visual cues to center Hatch on bulkhead.
13. Latch Hatch.
14. Release hatch tracks from temporary restrained position.
15. Rotate tracks onto hatch rollers, into installed position.

16. Install quick release pins into track.
17. Reconnect grounding cables on bulkhead to track.
18. For out-of-tolerance guides, loosen jammuts A and D completely (11/16" Combination Wrench, Ratchet 3/8" Drive, 11/16" Crowfoot).
19. Turn jammuts B and C manually to set alignment guide to bulkhead gap at 0.020 to 0.025 inches (Feeler Gauge).
20. Hold jamnut C stationary with combination wrench while torquing D against C to  $260 \pm 20$  inch pound (11/16" Combination Wrench, 11/16" Crowfoot, (30 - 200 in-lbs) Trq Wrench).
21. Hold jamnut B stationary with combination wrench while torquing jamnut A against B to  $260 \pm 20$  inch pound (11/16" Combination Wrench, 11/16" Crowfoot, (30 - 200 in-lbs) Trq Wrench).
22. Check alignment guide-to-bulkhead gap.  
If gap is within tolerance, continue with procedure.  
|  
If gap is not within tolerance, repeat alignment guide adjustment.
23. Loosen set screws (two) on roller assembly (Ratchet 3/8" Drive, 5/16" Hex Head).
24. Push track away from roller to take up slack while sliding head of roller to achieve .010 to .020 gap between roller and track (Feeler Gauges).
25. Snug set screws (two) on roller assembly, torque set screws (two) on roller assembly, torque to  $71 \pm 5$  in-lbs (5/16" Hex Head, (30-200 in-lbs) Trq Wrench).
26. Open and close Hatch several times to verify proper travel in tracks.  
If Hatch opens without binding, continue with procedure.  
|  
If Hatch binds when opening, repeat hatch roller assembly adjustment.
27. Mark, tape approximate location of latches on dome side of Hatch.
28. Close and latch Hatch.

NOTE

Gap between hatch plate and hatch seal metal substrate should be .015 to .025 inches at each location. Gap at the corners of Hatch should be .030 to .035 inches.

29. Measure gap between hatch plate and hatch seal metal substrate at latch locations (eight) (0.015 to 0.025) and hatch corners (four) (0.030 to 0.035) (Feeler Gauge).

If locations are out of tolerance, continue with procedure.

If locations are within tolerance, go to step TBD of this procedure.

30. Open Hatch.

31. Translate to Rib side of Hatch.

32. Close Hatch.

33. Measure gap between hatch plate and hatch seal metal substrate at latch locations (eight) and hatch corners (four) (Feeler Gauge).

If locations are out of tolerance,

Repeat adjust latch procedure until all latch locations (eight) have gap between 0.015 to 0.025 inches and all hatch corners (four) have gap between 0.030 to 0.035 inches.

If locations are within tolerance, continue procedure.

34. Open Hatch.

35. Visually inspect Hatch seals with 7X magnifying glass for nicks, burrs, cuts, gouges etc. that would impair proper seal.

36. Verify seal integrity by performing HATCH SEAL LEAK TEST.

#### POST MAINTENANCE

37. Stow Hatch, tools and equipment.

38. Update Maint Dbase.

## RPCM R&R NOD1D1

### OBJECTIVE:

Remove a failed RPCM and replace it with a spare.

### LOCATION:

Installed: NOD1D1

Stowed: \Maint DBbase

### DURATION:

30 minutes (If Alcove Shear Panels have been removed).

### PARTS:

RPCM-Int Type V (P/N R077419-31)

### MATERIALS:

Wet Wipes

Plastic Bags

### TOOLS REQUIRED:

Equipment Bag

Tethers

Kit E:

Ratchet 3/8" Drive

6" Ext 3/8" Drive

Driver Handle 1/4" Drive

Kit D:

5/32" Hex Head Driver, 1/4" Drive

EVA Kit:

7/16" x 6" Wobble Socket Extension, 3/8" Drive

Kit G:

(5-35 in-lbs) Trq Driver

(30-200 in-lbs) Trq Wrench

### REFERENCED PROCEDURE(S):

RPCM SAFE FOR MAINTENANCE

NODE 1 ALCOVE DECK SHEAR PANEL REMOVAL

ACTIVATE RPCM

### SAFE

#### **WARNING**

Failure to remove power can result in electrical shock hazard.

1. Don Anti-Static wrist tether.
2. Perform RPCM SAFE FOR MAINTENANCE procedure.

### ACCESS

3. Remove, tmpry stow Alcove Deck Closeout Panel, fasteners (ten) (Handle 1/4" Drive, 5/32" Hex Head Driver).
4. If Alcove Deck Shear Panels have not been removed
  - Perform NODE1 ALCOVE DECK SHEAR PANEL REMOVAL procedure.
 If Alcove Deck Shear Panels have been removed  
 Go to step 5.

### REMOVE

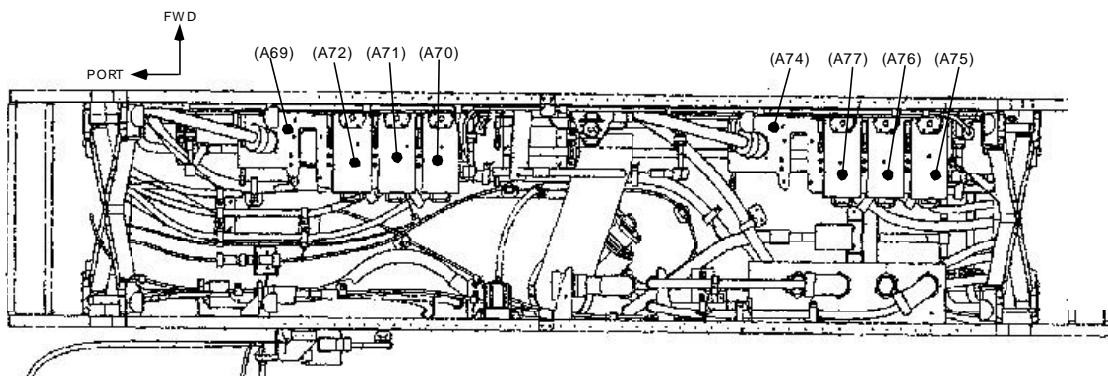


Figure 1.- Nadir View of Node 1 Alcove Deck (with Closeout and Shear Panel Removed).

Table 1. Node 1 Alcove Deck RPDA/RPCM Identification.

Name	Ref. Designator	RPCM Type
RPDA N1-RS2	(A74)	N/A
RPCM N1-RS2-A	(A75)	V
RPCM N1-RS2-B	(A76)	V
RPCM N1-RS2-C	(A77)	V
RPDA N1-3B	(A69)	N/A
RPCM N1-3B-A	(A70)	V
RPCM N1-3B-B	(A71)	V
RPCM N1-3B-C	(A72)	V

5. Locate failed RPCM.  
See Table 1 and Figure 1.

### CAUTION

Failure to fully seat 7/16" x 6" Wobble Socket Extension, apply constant pressure on drive screw could result in damage to RPCM locking mechanisms.

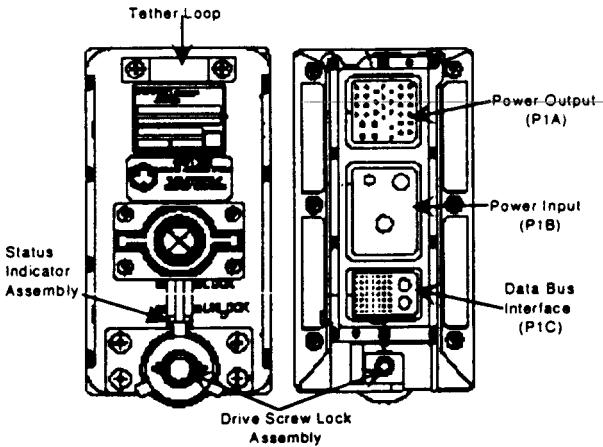


Figure 2.- Remote Power Control Module (Front and Back).

6. Apply pressure, loosen failed RPCM drive screw (Ratchet 3/8" Drive, 7/16" x 6" Wobble Socket Ext).
7. √Status indi - Unlock
8. Label, remove failed RPCM from receptacle by sliding it off guide rails.
9. Verify replacement RPCM part number RPCM-Int Type V (P/N R077419-31).
10. Remove electrical connector protective caps (two) from replacement RPCM to failed RPCM.  
Tmpty stow failed RPCM.

**REPLACE**

11. Inspect RPCM and mounting location for foreign matter/debris, damage to alignment guides, pins.
12. Clean coldplate bonding surface with Wet Wipes.

**CAUTION**

All internal RPCMs have the same physical characteristics. Forcing incorrect spare RPCM into receptacle could bend RPCM connector pins.

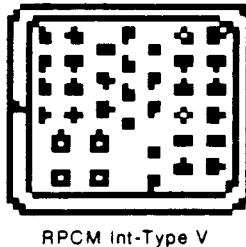


Figure 3.- RPCM Power Out Connector (Node 1).

13. Verify replacement RPCM Power Out connectors pins. See Figure 3.
14. Position replacement RPCM on guide rails of RPDA.
15. Insert RPCM into RPCM receptacle until status indicator reaches Unlock position.

**CAUTION**

Failure to fully seat 7/16" x 6" Wobble Socket Extension, apply constant pressure on drive screw could result in damage to RPCM locking mechanisms.

16. Apply pressure, tighten RPCM drive screw, torque to  $60 \pm 6$  in-lbs (Ratchet, 3/8" Drive, 7/16" x 6" Wobble Socket Ext, (30-200 in-lbs)Trq Wrench).
17.  $\checkmark$ Status indi - Lock

CHECK-OUT

18. Perform ACTIVATE RPCM procedure.

CLOSE-OUT

19. Install nadir Closeout Panel, fasteners (ten) torque to  $14 \pm 2$  in-lbs (Handle 1/4" Drive, 5/32" Hex Head Driver, (5-35 in-lbs) Trq Driver).

POST MAINTENANCE

20. Stow failed RPCM, tools, equipment.
21. Update Maint DBase.

## RPCM R&R NOD1O1

### OBJECTIVE:

Remove a failed RPCM and replace it with a spare.

### LOCATION:

Installed: NOD1O1

Stowed: \Maint DBase

### DURATION:

30 minutes (If Alcove Shear Panels have been removed)

### PARTS:

RPCM-Int Type V (P/N R077419-31)

### MATERIALS:

Wet Wipes

Plastic Bag

### TOOLS REQUIRED:

Equipment Bag

Tethers

Kit E:

Ratchet 3/8" Drive

6" Ext 3/8" Drive

Driver Handle 1/4" Drive

Kit D:

5/32" Hex Head Driver, 1/4" Drive

EVA Kit:

7/16" x 6" Wobble Socket Extension, 3/8" Drive

Kit G:

(5-35 in-lbs) Trq Driver

(30-200 in-lbs) Trq Wrench

### REFERENCED PROCEDURE(S):

NODE 1 ALCOVE OVHD SHEAR PANEL REMOVAL

RACU 5 DEACTIVATION

RACU 6 DEACTIVATION

APCU DEACTIVATION

RACU 5 ACTIVATION

RACU 6 ACTIVATION

APCU ACTIVATION

### SAFE

#### **WARNING**

Failure to remove power can result in  
electrical shock hazard.

**CAUTION**

Equipment contains parts sensitive to damage by Electronic Discharge (ESD)

1. Don Anti-Static wrist tether.
2. Safe failed RPCM for maintenance by isolating upstream power source. Refer to Table 1 for correct procedure.

Table 1. RPCM Power Source.

RPCM	POWER SOURCE	PROCEDURE
N1RS1 A, B, C	RACU 6	(SODF) RACU 6 DEACTIVATION
N1RS2 A, B, C	RACU 5	(SODF) RACU 5 DEACTIVATION
N13B A, B, C	APCU 1	(SODF) APCU DEACTIVATION
N14B A, B, C	APCU 2	(SODF) APCU DEACTIVATION

**ACCESS**

3. Remove, tmpry stow Alcove Ovhd Closeout Panel, fasteners (ten) (Handle 1/4" Drive, 5/32" Hex Head Driver).
4. If Alcove Ovhd Shear Panels have not been removed  
Perform NODE 1 ALCOVE SHEAR PANEL REMOVAL procedure  
If Alcove Ovhd Shear Panels have been removed  
Go to step 5.

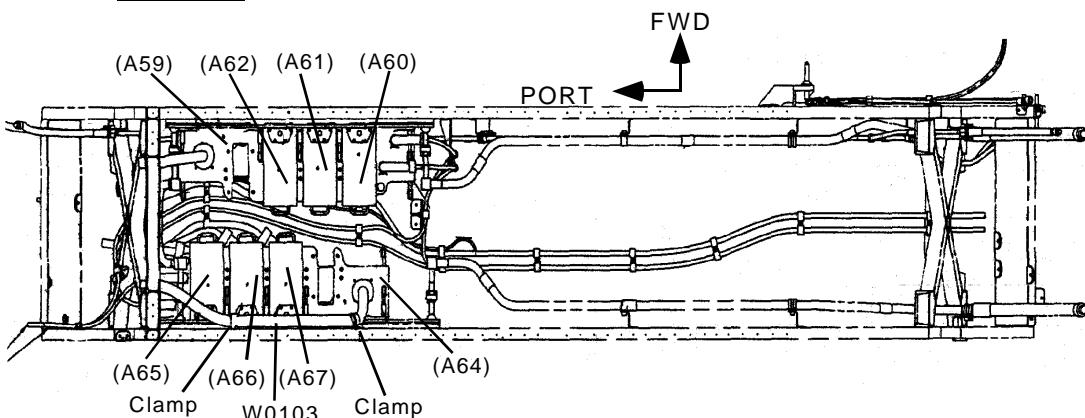
**REMOVE**

Figure 1.- Nadir View of Node 1 Forward Nadir Alcove with Closeout and Shear Panel Removed.

5. If failed RPCM located on RPDA N1RS1, remove cable wire harness W0103 from clamps (two) (3/8" Socket, 1/4" Drive, 4" Ext, 1/4" Drive, 4" Ext, 1/4" Drive, Ratchet 1/4" Drive). See Figure 1.  
If not, continue to step 6

Table 2. RPCM Designator

Name	Ref. Designator	RPCM Type
RPDA N1-RS1	(A64)	N/A
RPCM N1-RS1-A	(A65)	V
RPCM N1-RS1-B	(A66)	V
RPCM N1-RS1-C	(A67)	V
RPDA N1-4B	(A59)	N/A
RPCM N1-4B-A	(A60)	V
RPCM N1-4B-B	(A61)	V
RPCM N1-4B-C	(A62)	V

6. Locate failed RPCM.

See Figure 1 and Table 2.

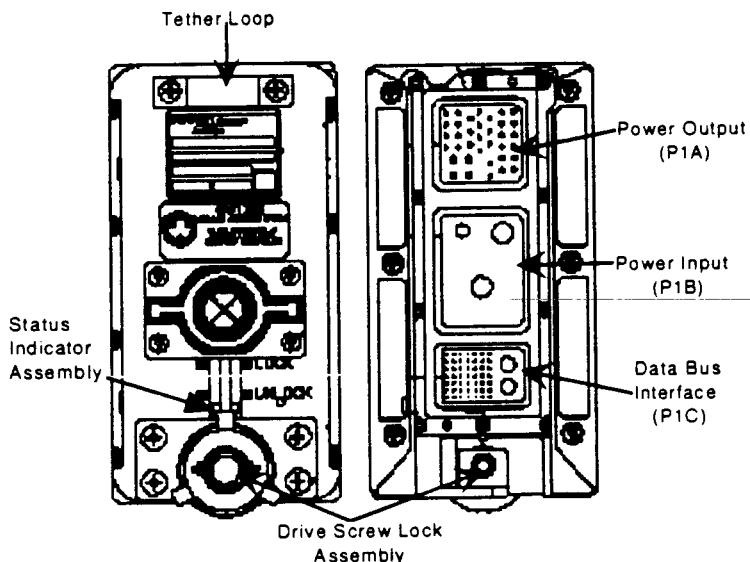
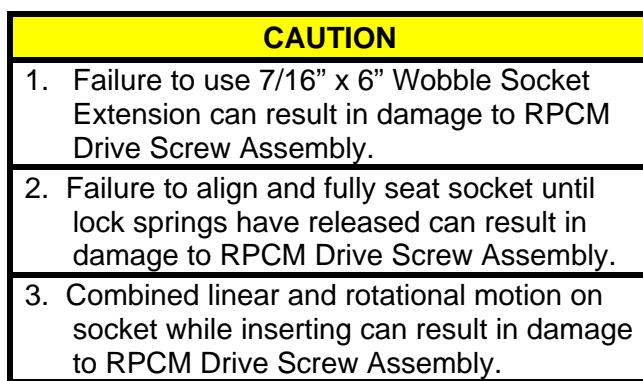


Figure 2.- Remote Power Control Module (Front and Back).

7. Apply constant pressure to release RPCM lock springs without rotational motion.

Loosen failed RPCM drive screw (nine turns) (Ratchet 3/8" Drive, 7/16" x 6" Wobble Socket Ext). See Figure 2.

NOTE

RPCM Status Indicator will move from the LOCK line to the UNLOCK line when Drive Screw Assembly is initially disengaged and from UNLOCK line to below UNLOCK line when RPCM is removed from RPDA/SPDA.

8. √Status indi - UNLOCK

NOTE

If failed RPCM located on RPDA N1RS1, cable wire harness W0103 must be pulled up when removing RPCM from RPDA.

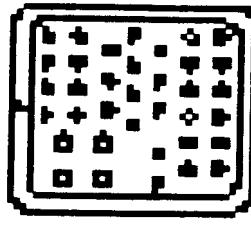
9. Label, remove failed RPCM from RPDA by sliding it off guide rails.
10. Verify replacement RPCM part number RPCM-Int Type V (P/N R077419-31).
11. Remove electrical connector protective caps (two) from replacement RPCM, install on failed RPCM.  
Tmpty stow failed RPCM.

REPLACE

12. Inspect RPCM and mounting location for foreign matter/debris, damage to alignment guides, pins.
13. Clean coldplate bonding surface with wet wipes.

**CAUTION**

All internal RPCMs have the same physical characteristics. Forcing incorrect spare RPCM into receptacle could bend RPCM connector pins.



RPCM Int-Type V

Figure 3.- RPCM Power Out Connector (Node 1).

14. Verify replacement RPCM Power Out connectors pins.  
See Figure 3.

NOTE

When installing replacement RPCM on RPDA N1RS1, pull cable wire harness W0103 up when inserting RPCM on RPDA.

15. Position replacement RPCM on guide rails of RPDA.
16. Insert RPCM onto RPDA until status indicator reaches UNLOCK position.

<b>CAUTION</b>
1. Failure to use 7/16" x 6" Wobble Socket Extension can result in damage to RPCM Drive Screw Assembly.
2. Failure to align and fully seat socket until lock springs have released can result in damage to RPCM Drive Screw Assembly.
3. Combined linear and rotational motion on socket while inserting can result in damage to RPCM Drive Screw Assembly.

17. Apply constant pressure to release RPCM lock springs without rotational motion, tighten RPCM drive screw, torque to  $60 \pm 6$  in-lbs (Ratchet, 3/8" Drive, 7/16" x 6" Wobble Socket Ext, (30-200 in-lbs) Trq Wrench).
18.  $\checkmark$ Status indi - LOCK
19. If replacement RPCM located on RPDA N1RS1, install cable wire harness W0103 from clamps (two) (3/8" Socket, 1/4" Drive, 4" Ext, 1/4" Drive, 4" Ext, 1/4" Drive, Ratchet 1/4" Drive). See Figure 1.  
If not, go to step 20.

#### CHECK-OUT

20. Reapply power to RPCM by activating upstream power source. Refer to Table 3 for correct procedure.

Table 3. RPCM Power Source.

RPCM	POWER SOURCE	PROCEDURE
N1RS1 A, B, C	RACU 6	(SODF) RACU 6 DEACTIVATION
N1RS2 A, B, C	RACU 5	(SODF) RACU 5 DEACTIVATION
N13B A, B, C	APCU 1	(SODF) APCU DEACTIVATION
N14B A, B, C	APCU 2	(SODF) APCU DEACTIVATION

#### CLOSE-OUT

21. Install Ovhd Closeout Panel.  
Install Fasteners (ten), torque to  $14 \pm 2$  in-lbs (Handle 1/4" Drive, 5/32" Hex Head Driver, (5-35 in-lbs) Trq Driver).

#### POST MAINTENANCE

22. Stow failed RPCM, tools, equipment.
23. Update Maint Dbase.

## **IMV FAN R&R NODE 1**

### OBJECTIVE:

Remove and replace failed IMV Fan.

### LOCATION:

Installed: NOD1P0, NOD1S0, NOD1S3, TBD

### DURATION:

25 minutes

### PARTS:

IMV Fan (P/N SV809111-1)

### MATERIALS:

Tape

### TOOLS REQUIRED:

Equipment Bag

Kit C:

1/4" Socket, 1/4" Drive  
7/16" Socket, 1/4" Drive

Kit E:

10" Ext 1/4" Drive  
4" Ext 1/4" Drive  
Ratchet 1/4" Drive

Kit F:

5/32" 6 Pt Socket 1/4" Drive

Kit G:

(5-35 in-lbs) Trq Driver, 1/4" Drive

### REFERENCED PROCEDURE(S):

NODE 1 ALCOVE SHEAR PANEL REMOVE ZENITH (NADIR)

NODE 1 ALCOVE SHEAR PANEL REMOVE STBD

NODE 1 ALCOVE SHEAR PANEL REMOVE PORT

NODE 1 MIDBAY SHEAR PANEL REMOVE STBD

## SAFE

### **WARNING**

Failure to remove power can result in electrical shock hazard.

1. Remove power from IMV Fan via software. TBD

## ACCESS

Table 1. Closeout Panel for Node 1 IMV fans.

Panel Location	Number of fasteners	Tool
NOD1P0	14	5/32" 6 Pt Socket, Ratchet 1/4" Drive---TBD
NOD1S0	14	5/32" 6 Pt Socket, Ratchet 1/4" Drive---TBD
NOD1O0	10	5/32" 6 Pt Socket, Ratchet 1/4" Drive---TBD
NOD1S3	TBD	TBD

2. If Shear Panels have not been removed
    - Perform appropriate shear panel removal procedure. See Table 1.  
NODE 1 ALCOVE SHEAR PANEL REMOVE ZENITH (NADIR)  
NODE 1 ALCOVE SHEAR PANEL REMOVE STBD  
NODE 1 ALCOVE SHEAR PANEL REMOVE PORT  
NODE 1 MIDBAY SHEAR PANEL REMOVE STBD
- If Shear Panels have been removed  
Go to step 3.

### **WARNING**

Burn hazard exists for failure to allow IMV Fan to cool down for two hours prior to removal.

## REMOVE IMV FAN

3. Power cable PTBD (PG1)  $\leftarrow\rightarrow$  J2.
4. Data cable PTBD (PG1)  $\leftarrow\rightarrow$  J1.
5. Unfasten grounding strap TBD fastener (1/4" Socket, 4" Ext, Ratchet 1/4" Drive).
6. Unfasten IMV Fan inlet air manifold hose clamp (1/4" Socket, 4" Ext, Ratchet 1/4" Drive).
7. Push clamp onto duct.

8. Unfasten IMV Fan outlet air manifold hose clamp (1/4" Socket, 4" Ext, Ratchet 1/4" Drive).
9. Push clamp onto duct.
10. Remove, tmpry stow IMV Fan, fasteners (four) (7/16" Socket, 10" Ext, Ratchet 3/8" Drive).

**REPLACE IMV FAN**

11. Remove electrical connector caps (two) from replacement IMV Fan, install on failed IMV fan.
12. Install replacement IMV Fan by aligning it on guide pins.
13. Tighten IMV Fan structural support fasteners (four), torque to 30 in-lbs (3/8" socket, 4" Ext., (5-35 in-lbs) Trq Wrench).
14. Install, snug IMV Fan inlet air manifold clamp (1/4" Socket, 4" Ext, Ratchet 1/4" Drive).
15. Install, snug IMV Fan outlet air manifold clamp (1/4" Socket, 4" Ext, Ratchet 1/4" Drive).
16. Fasten grounding strap TBD fastener (1/4" Socket, 4" Ext, Ratchet 1/4" Drive).
17. Power cable PTBD (PG1) →|← J2.
18. Data cable PTBD (PG1) →|← J1.

**CHECK-OUT IMV FAN**

19. Supply power to IMV Fan via software. TBD
20. Perform TBD BIT.

**CLOSE OUT IMV FAN**

21. Install Closeout Panel for appropriate IMV fan. See Table 1.
22. Stow failed ORU, tools, equipment.
23. Update Maint Dbase.

TCS PROCEDURES

NODE 1/PMA 1 MANUAL HEATER OPERATIONS..... 2-39

TCS

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TCS

## NODE 1/PMA 1 MANUAL HEATER OPERATIONS

1. COMPARE SHELL TEMP(S) TO LIMITS AND POWER HEATER ON/OFF

PCS Node 1: TCS

**NODE1: TCS**

sel PMA1(NODE1) Htr[X]A(B)

**PMA1(Nod 1) Htr[X]A(B)**

If PMA1(NODE1) Htr[X]A(B) RPC Tripped

√MCC-H

### NOTE

For Node 1 Heaters with two temperature sensors, each temperature reading should be compared to the limits for that specific sensor in order to decide whether to turn the heater on or off. If all temperature sensors in a zone have failed then sensors in adjacent zones may be used.

If PMA1(Node1) Htr[X]A(B) Temp < PMA1(Node1) Htr[X]A(B) Lower Setpoint

'RPCM [...] PMA1(Nod1) Htr[X]A(B)'

√Close Cmd - Ena

sel PMA1(Nod1) Htr[X]A(B) RPC Commands

**RPCM [...] PMA1(Nod1) Htr[X]A(B) COMMANDS**

**cmd Close Execute**

**PMA1(Nod 1) Htr[X]A(B)**

'RPCM [...] PMA1(Nod1) Htr[X]A(B)'

√Position - Cl

If PMA1(Node1) Htr[X]A(B) Temp > PMA1(Node1) Htr[X]A(B) Upper Setpoint

'RPCM [...] PMA1(Nod1) Htr[X]A(B)'

√Open Cmd - Ena

sel PMA1(Node1) Htr[X]A(B) RPC Commands

**RPCM [...] PMA1(Nod1) Htr[X]A(B) COMMANDS**

**cmd Open Execute**

PMA1(Nod 1) Htr[X]A(B)  
‘RPCM [...] PMA1(Nod1) Htr[X]A(B)’

✓Position - Op

2. **REPEAT HEATER POWER ON/OFF CYCLES AS REQUIRED**  
Repeat Step 1 after TBD hours.

QUICK RESPONSE

ISS LEAK.....	3-3
LOAD SHED INITIATE .....	3-10

QUICK  
RESPONSE

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## ISS LEAK

### TOOLS AND EQUIPMENT REQUIRED

Ratchet Wrench  
1/4" to 3/8" Adapter  
3/8" to 1/4" Adapter  
3/8" Universal Joint  
TBD - Tools required for panel removal  
APAS Hatch Tool  
7/16" Deepwell Socket  
TBD" Extension  
Flashlight  
D-cell Batts (sixteen)  
Desiccant/Shroud assemblies (four)  
Standard Screwdriver

#### NOTE

For steps 1-2, **MCC-H** will assist in determining when leak has been isolated using Node 1 module pressure decay.

**SPEC 66 ENVIRONMENT**    or    **SM SYS SUMM 1**

### REMOTE ISOLATION STEPS

Node 1 Fwd

1. If pre-ingress
  - Close Forward Stbd IMV Valve**  
Nod1: ECLSS: Fwd Stbd IMV Vlv  
[ Nod1 Fwd Stbd IMV Vlv ]  
'RPCM N13B C RPC 13'

EPICS

1. √Close Cmd - Ena  
sel RPC Commands  
**cmd Close Execute**  
√Position - Cl  
  
'Nod1 Fwd Stbd IMV Vlv'
2. sel Vlv Commands  
**cmd On Execute**  
√Op - Op  
√Cl - Not Cl  
√Stat - Op  
√Ena Stat - On
3. sel Vlv Commands  
**cmd Close Execute**  
√Stat - In Trans  
Wait 20 seconds  
√Stat - Cl

- Node 1 Aft EPICS
2. If post-ingress
- Close Forward Port IMV Valve
- Nod1: ECLSS: Fwd Port IMV Vlv
- Nod1 Fwd Port IMV Vlv
- 'RPCM N13B C RPC 14'
4. √Close Cmd - Ena  
sel Vlv Commands  
**cmd Close Execute**  
√Position - Cl  
  
'Nod1 Fwd Port IMV Vlv'
  5. sel Vlv Commands  
**cmd On Execute**  
√Op - Op  
√CI - Not CI  
√Stat - Op  
√Ena Stat - On
  6. sel Vlv Commands  
**cmd Close Execute**  
√Stat - In Trans  
Wait 20 seconds  
√Stat - Cl
  7. If leak not isolated, perform steps 11.1 and 11.2.
- Close Aft Stbd IMV Valve
- Nod1: ECLSS: Aft Stbd IMV Vlv
- Nod1 Aft Stbd IMV Vlv
- 'Nod1 Aft Stbd IMV Vlv'
1. sel Vlv Commands  
**cmd Close Execute**  
√Stat - In Trans  
Wait 20 seconds  
√Stat - Cl
- Close Aft Port IMV Valve
- Nod1: ECLSS: Aft Port IMV Vlv
- Nod1 Aft Port IMV Vlv
- 'Nod1 Aft Port IMV Vlv'
2. sel Vlv Commands  
**cmd Close Execute**  
√Stat - In Trans  
Wait 20 seconds  
√Stat - Cl

3. If leak not isolated, perform steps 12.1 and 12.2.

## CONFIGURE SHUTTLE FOR NODE 1 INGRESS

## NOTE

Upon execution of next step, PMA 2 will be pressurized, if required.

ODS Hatch	3. Equal vlv (two) → Emer 4. Open ODS Hatch per decal.
CM 1,2	5. Ingress External Airlock
Inner A/L Hatch	6. Equal vlv (two) → Emer 7. Close Inner Hatch per decal.

**INGRESS ISOLATION STEPS**

8. If pre-ingress

PMA 2 Ingress

1. APAS Equal Vlv → Op

2. Open APAS Hatch  
Select ‘ÅÄÅÎ ×Å’ (WORKING) torque setting on hatch tool.  
Insert tool in hatch socket and rotate 3 to 4 turns in direction of ‘I ÖÐ’ (OPEN) arrow until tool clicks.

\*\*\*\*\*  
\* If tool prematurely slips or did not engage \*  
\* Select ‘ÅÄÅÅÉÉÍ Å’ (Emergency) \*  
\* setting on hatch tool. \*  
\* Reattempt to rotate. \*  
\*\*\*\*\*

Remove tool.  
Attempt to open Hatch.  
Secure Hatch in open position using fixing device.

Node 1 Fwd Hatch	3. Open Node 1 Fwd Hatch per decal.
------------------	-------------------------------------

Node 1 PPRV Configuration

4. Cap Node 1 Port PPRV  
5. Cap Node 1 Stbd PPRV  
6. Report status to **MCC-H**.  
7. Go to Step 9.1.

9. If concurrent with ingress
- Node 1 IMV Valves
    1. ✓Port Fwd IMV Vlv (one) - CI
    2. ✓Stbd Fwd, Stbd Aft IMV Vlv (two) - CI
    3. ✓Deck Fwd, Deck Aft IMV Vlv (two) - CI
  - Node 1 NPRV Verification
    4. Remove, tmpry stow Closeout Panel using TBD tools.
    5. ✓Stbd Fwd NPRV Cover - CI
    6. Report status to **MCC-H**.
    7. Remove, tmpry stow Closeout Panel using TBD tools.
    8. ✓Stbd Aft NPRV Cover - CI
    9. Report status to **MCC-H**.
    10. Remove, tmpry stow Closeout Panel using TBD tools.
    11. ✓Stbd Fwd NPRV Cover - CI
    12. Report status to **MCC-H**.
  - Module Isolation
  - If FGB ingress concurrent
    - 13. Clear hatchway and close FGB PA-ICC Hatch per directions.
    - 14. If dP/dT positive or zero (FGB ICC leak)  
✓MCC-H
    - 15. Disconnect ducting from PMA 1 hard duct, stow in FGB PA.
    - 16. Clear hatchway and close FGB PMA1-PA Hatch with hatch tool.
    - 17. If dP/dT positive or zero (FGB PA leak)  
✓MCC-H
  - If PMA 1 ingress concurrent
    - 18. Clear hatchway and close Node 1 Aft Hatch per decal.
    - 19. NOD1 Aft Port, Stbd IMV vlv (two) - Close
    - 20. If dP/dT positive or zero (PMA 1 leak)  
✓MCC-H
  - If Node 1 ingress concurrent
    - 21. Clear hatchway and close Node 1 Fwd Hatch per decal.
    - 22. NOD1 Fwd Port, Stbd IMV vlv (two) - Close
    - 23. If dP/dT positive or zero (Node 1 leak)  
✓MCC-H
  - If PMA 2 ingress concurrent
    - 24. Clear hatchway and close PMA 2 APAS Hatch with hatch tool.

10. If post-egress
- Re-Ingress PMA 2
1.  $\checkmark$  APAS Equal Vlv → Op
  2. Open APAS Hatch  
Select  $\text{DAA} \times \text{AA}$  (WORKING) torque setting on hatch tool.  
Insert tool in hatch socket and rotate 3 to 4 turns in direction of ' $\uparrow \text{OPEN}$ ' (OPEN) arrow until it clicks.

---

\* If tool prematurely slips or did not engage \*

\* Select 'AAADAEI I A' (Emergency) \*

\* setting on hatch tool. \*

\* Reattempt to rotate. \*

---

Remove tool.  
Attempt to open Hatch.  
Secure Hatch in open position using fixing device.

3. If leak in Node 1 Forward Hatch or forward bulkhead

Verify Fwd IMV vlv and cap seal integrity

Nod1: ECLSS: Fwd Stbd IMV Vlv

Nod1 Fwd Stbd IMV Vlv

'Nod1 Fwd Stbd IMV Vlv'

$\checkmark$  Stat - CI

Nod1: ECLSS: Fwd Port IMV Vlv

Nod1 Fwd Port IMV Vlv

'Nod1 Fwd Port IMV Vlv'

$\checkmark$  Stat - CI

$\checkmark$  Fwd Stbd, Fwd Port IMV cap secured (two)

Report status to **MCC-H**.

Reseat Node 1 Fwd Hatch

MPEV → Open

Open Hatch per decal.

$\checkmark$  Fwd Stbd, Fwd Port IMV vlv (two) - CI

Close Hatch

Report status to **MCC-H**.

- ~
4. If no leak, re-ingress Node 1  
[Equalize Node 1](#)  
 Node 1 Fwd MPEV → Op  
 Open Hatch per decal.  
 Go to step 8.4.

IMV VALVE RECONFIGURATION (Perform if leak not isolated)

11. If Forward IMV valves closed as part of remote isolation

[Open Forward Stbd IMV Valve](#)

Nod1: ECLSS: Fwd Stbd IMV Vlv  

<a href="#">Nod1 Fwd Stbd IMV Vlv</a>
---------------------------------------

  
 'Nod1 Fwd Stbd IMV Vlv'

1. sel Vlv Commands  
**cmd** Open **Execute**  
 √Stat - In Trans  
 Wait 20 seconds  
 √Stat - Op

[Open Forward Port IMV Valve](#)

Nod1: ECLSS: Fwd Port IMV Vlv  

<a href="#">Nod1 Fwd Port IMV Vlv</a>
---------------------------------------

  
 'Nod1 Fwd Port IMV Vlv'

2. sel Vlv Commands  
**cmd** Open **Execute**  
 √Stat - In Trans  
 Wait 20 seconds  
 √Stat - Op

12. If Aft IMV valves closed as part of remote isolation

[Open Aft Stbd IMV Valve](#)

Nod1: ECLSS: Aft Stbd IMV Vlv  

<a href="#">Nod1 Aft Stbd IMV Vlv</a>
---------------------------------------

  
 'Nod1 Aft Stbd IMV Vlv'

1. sel Vlv Commands  
**cmd** Open **Execute**  
 √Stat - In Trans  
 Wait 20 seconds  
 √Stat - Op

[Open Aft Port IMV Valve](#)

Nod1: ECLSS: Aft Port IMV Vlv  

<a href="#">Nod1 Aft Port IMV Vlv</a>
---------------------------------------

  
 'Nod1 Aft Port IMV Vlv'

2. sel Vlv Commands
- cmd Open **Execute**
- √Stat - In Trans
- Wait 20 seconds
- √Stat - Op

#### NODE 1 AND PMA 2 EGRESS CONFIGURATION

13. Perform only if contingency ingress required after FD8.

##### Portable Fan Reconfiguration

1. √Fan Pwr (four) - Off  
Install fresh batteries.
2. Attach desiccant/shroud assemblies to each fan (four).
3. Fan Power (four) - High
4. √Fan RPM control position (four) - Full CW, fan running

#### NODE 1 AND PMA 2 CLOSEOUT

14. √Fwd Stbd, Fwd Port IMV vlv (two) - CI

Nod1 Fwd Hatch

15. If leak isolated
  - MPEV - close, cap installed
- If leak not isolated
  - MPEV - open, uncapped

16. Close Node 1 Forward Hatch per decal.

APAS Hatch

17. Close APAS Hatch with hatch tool.
18. APAS Equal Vlv - Op
19. Close ODS Hatch per decal.
20. Equal vlv (two) - Off, capped

## LOAD SHED INITIATE

CRT      **SM 210 NODE 1**

Initiate LOAD SHED  
NCS LOAD SHED - ITEM 4 +9 9 EXEC

PCS      FGB: EPS  
          **FGB: EPS**

sel Load Shed  
sel Commands

**cmd Active Execute**

## CUE CARDS

ISS EMERGENCY EGRESS .....	4-3
ISS CONTINGENCY EGRESS.....	4-4
NODE 1 FIRE/SMOKE.....	4-5
FGB FIRE/SMOKE .....	4-6

CUE CARDS

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TOP



## ISS EMERGENCY EGRESS

- |                               |   |
|-------------------------------|---|
| FGB PA,<br>PMA 1              | If FGB ingress concurrent<br>1. Disconnect ducting from PMA 1 hard duct, stow in FGB PA.<br>2. Clear hatchway and close PMA1-PA Hatch with hatch tool.<br>3. Report "FGB egress complete."  |
| Node 1,<br>PMA 2,<br>ODS Vest | If Node 1 ingress concurrent<br>4. Remove two PPRV caps.<br>5. Disconnect Station/Shuttle Extension duct, stow in PMA 2.<br>6. Clear hatchway and close PMA2 Hatch with hatch tool.<br>7. APAS Equal Vlv → Cl<br>8. Report "ISS egress complete." |

ISS MAL-1a/2A/A



TOP  
BACK OF "ISS EMERGENCY EGRESS"

HOOK  
VELCRO

HOOK  
VELCRO

## ISS CONTINGENCY EGRESS

- |                        |  |
|------------------------|--|
| FGB PA,<br>PMA 1       | If FGB ingress concurrent <ul style="list-style-type: none"><li>1. Detach, stow ducting from PA-ICC interface.</li><li>2. Close PA-ICC Hatch.</li><li>3. Detach, stow ducting from PMA1-PA interface.</li><li>4. Close PMA1-PA Hatch with hatch tool.</li><li>5. Report "FGB egress complete."</li></ul>                                 |
| Node 1                 | If Node 1 ingress concurrent <ul style="list-style-type: none"><li>6. Install desiccant shroud assemblies to portable fans and activate fans.</li><li>7. Remove two PPRV caps.</li><li>8. Node 1 Fwd Port, Stbd IMV vlv (two) → Close</li><li>9. Clear hatchway and close Node 1 Fwd Hatch per decal.</li><li>10. MPEV → Close</li></ul> |
| Node 1<br>Fwd<br>Hatch | <ul style="list-style-type: none"><li>11. ARLK FAN A(B) → Off</li><li>12. Disconnect Station/Shuttle Extension duct, stow in PMA 2.</li><li>13. Close PMA2 Hatch with hatch tool.</li><li>14. APAS Equal Vlv → Cl</li><li>15. Report "ISS egress complete."</li></ul>  |
| MO13Q<br>ODS Vest      |  |

ISS MAL-1b/2A/A

HOOK  
VELCROHOOK  
VELCRO**NODE 1 FIRE/SMOKE****CDR/PLT ACTION**

- MO13Q      1. ARLK FAN A(B) → Off  
               2. APCU 2 Converter → Off  
               √Converter tb - bp  
               √Output tb - bp  
               √APCU 2 Output - Off  
               On call "PMA2 Hatch secure"
- L12U      3. APCU 1 Converter → Off  
               √Converter tb - bp  
               √Output tb - bp  
               APCU 1 Output - Off  
               SM 210 NODE 1
- A7L      4. NCS LOAD SHED - ITEM 4 +9 EXEC  
               5. Verify if fire continues  
                     Report from Node 1 crew prior to egress  
                     Cont NOD1 CABIN PRESS incr  
                     (786 mmHg (15.2 psi) and ↑)  
                     If fire continues on **MCC** call:  
                     6. Call Ext A/L "Prepare for Node 1 Depress."  
                     7. √cb SYS PWR CNTL ESS 1BC(2CA) SYS 1(2) - CI  
                     8. √SYS PWR MN A(B) - On (tb - On)  
                     On call "ODS Hatch secure."  
                     9. cb DEP MN A(B) SYS 1(2) VENT ISOL → CI  
                     10. cb DEP MN A(B) SYS 1(2) VENT → CI  
                     11. VEST DEP VLV SYS 1(2) VENT ISOL → Op (tb - Op)  
                     12. VEST DEP VLV SYS 1(2) VENT → Op (tb - Op)  
                     SM 167 DOCKING STATUS  
                     SM 066 ENVIRONMENT  
                     13. When AIRLOCK-VEST ΔP ≈CABIN P (within 0.2 psid)  
                         VEST DEP VLV SYS 1(2) VENT → CI (tb - CI)  
                         VEST DEP VLV SYS 1(2) VENT ISOL → CI (tb - CI)  
                         cb DEP MN A(B) SYS 1(2) VENT → Op  
                         cb DEP MN A(B) SYS 1(2) VENT ISOL → Op  
                     14. Perform orbiter cabin air monitoring per POST-FIRE  
                     CABIN CLEANUP (ORB PKT)

**MODULE CREW ACTION**

- FGB PA Hatch      1. Inform CDR/PLT "Fire in Open Volume" or "Fire behind closeouts."  
                     2. Turn off Portable Ventilation.  
                     3. Remove pwr source (if possible).  
                     4. Use handheld extinguisher as required.  
                     Notify CDR/PLT if not successful.  
                     5. Close FGB PA APAS Hatch with hatch tool.  
                     Egress to orbiter.  
                     6. Close PMA2 Hatch with hatch tool.  
                     7. √Equal Vlv - CI
- PMA2 Hatch      8. Report "PMA2 Hatch secure" and fire status.  
                     9. On call "Prepare for Node 1 depress"  
                     PMA2 Hatch PEV → Op  
                     10. Close ODS Hatch per decal  
                     √Equal Vlvs (two) → Off, caps installed  
                     11. Report "ODS Hatch secure."

ISS MAL-2a/2A/A

TOP  
BACK OF "NODE 1 FIRE/SMOKE"

## FGB FIRE/SMOKE

HOOK  
VELCRO

HOOK  
VELCRO

### CDR/PLT ACTION

- 1. If FGB Hatches are closed  
√MCC-H >>
- 2. ARLK FAN A(B) → Off
- 3. If fire reported by FGB crew  
NODE 1: ECLSS: Cab Fan  
**Nod1 Cab Fan**  
sel 'Nod1 Cab Fan'  
sel Fan Commands  
**cmd Off Execute**  
√Spd, rpm ~0 or decreasing
- EPICS NODE 1: ECLSS: FDIR  
**Nod1 FDIR Details**  
sel Commands

**NOTE**  
The following command will deactivate the Aft Port IMV fan and close Fwd and Aft IMV valves.

**cmd Nod1 IMV Isol Execute**  
√N1\_1\_MDM Fire Isol Stat - Isol  
√N1\_2\_MDM Fire Isol Stat - Isol

- PCS 4. FGB: ECLSS

**FGB: ECLSS**

√Location of fire, report to FGB Module crew.  
√FGB Nod1 PEV - CI

- 5. On call, "PMA1-PA Hatch closed."  
ARLK FAN A(B) → On
- 6. Perform Orbiter/Node 1 cabin air monitoring per ECLS FRP-2 (FDF MAL, ECLS)

### FGB MODULE CREW ACTION

**NOTE**  
FGB Fans and Electrical Equipment will perform auto shutdown 30 seconds after fire annunciation. At 20 minutes later, fans and equipment will be restarted for 10 minutes for fire sensor polling. Then, this deact/react repeats again for two more times.

ICC Panel  
ΠICC

PMA 1

Node 1  
Fwd

1. If required, ASK pb - push (stops siren)  
√■CI (Light off)
2. Inform CDR/PLT: "Fire behind closeouts" or "Fire in open volume."
3. Disconnect ducting from PMA 1 hard duct. Stow in FGB PA.
4. Clear hatchway and close PMA1-PA Hatch with hatch tool.
5. Inform CDR/PLT: "PMA1-PA Hatch closed."

### NODE 1 MODULE CREW ACTION

1. Node 1 Fwd Stbd, Port IMV vlvs (two) → Close
2. Node 1 Aft Stbd, Port IMV vlvs (two) → Close

ISS MAL-2b/2A/A

REFERENCE INFORMATION

NCS C&W EVENT TABLE .....	5-3
N1-1 MDM CHANNEL ASSIGNMENTS.....	5-14
N1-2 MDM CHANNEL ASSIGNMENTS.....	5-21
1553 BUS ASSIGNMENTS - 2A & SUBS.....	5-28
INPUT/OUTPUT CARDS.....	5-29
FLIGHT 2A C&DH OVERVIEW .....	5-30
FGB COMPUTER SYSTEM HARDWARE BLOCK DIAGRAM .....	5-31
POWER CONFIGURATION .....	5-32
LOAD SHED TABLE OVERLAY VERSIONS.....	5-33
2A POWER BUS CONNECTIVITY .....	5-39
NODE 1 INTERNAL LIGHT LOCATIONS.....	5-43
APCU STATUS DISPLAY.....	5-44
SPEC 201 CBM CONTROL DISPLAY.....	5-46
SPEC 202 CBM POWER DISPLAY.....	5-56
SPEC 203 EARLY COMM DISPLAY .....	5-63
SPEC 204 FGB DISPLAY.....	5-66
SPEC 210 NODE 1 DISPLAY.....	5-71
SPEC 212 OIU DISPLAY.....	5-77

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NCS C&amp;W EVENT TABLE

System	Message Text	Class	Element	SubSystem	P2 PUI	Event Code	Event Driver	Analog Limit Low	Analog Limit High	Discrete Value 0=	Discrete Value 1=	Limit Location PPL ID and/or Cmd	Flight Effectivity
CDH	Prime NCS Detected RT Fail SMCC-3 - SM	C	SM	SMCC 3	M1DP47MDX005U	159				Nominal	In Alarm		2A.1 +
CDH	Prime NCS Detected RT Fail SMCC-2 - SM	C	SM	SMCC 2	M1DP47MDX007U	161				Nominal	In Alarm		2A.1 +
CDH	Prime NCS Detected RT Fail SMCC-1 - SM	C	SM	SMCC 1	M1DP47MDX009U	163				Nominal	In Alarm		2A.1 +
CDH	Prime NCS Detected RT Fail MDM FGB-2 - FGB	C	FGB	FGB MDM 2	M1DP47MDX011U	165				Nominal	In Alarm		2A +
CDH	Prime NCS Detected RT Fail MDM FGB-1 - FGB	C	FGB	FGB MDM 1	M1DP47MDX013U	167				Nominal	In Alarm		2A +
CDH	MDM N1-1 Detected RT Fail MDM N1-2 - PMA 1	C	PMA1	Nod1 2 MDM	M1DS47MDX012U	7				Nominal	In Alarm		2A +
CDH	MDM N1-1 User Bus Orb N1-1 Fail - NOD1	C	PMA1	Nod1 1 MDM	M1DS47MDX014U	9				Nominal	In Alarm		2A +
CDH	MDM N1-2 Detected RT Fail MDM N1-1 - PMA 1	C	PMA1	Nod1 1 MDM	M1DS48MDX004U	67				Nominal	In Alarm		2A +
CDH	MDM N1-2 User Bus Orb N1-2 Fail - NOD1	C	PMA1	Nod1 2 MDM	M1DS48MDX014U	77				Nominal	In Alarm		2A +
CDH	Prime NCS Detected RT Fail OIU - Shuttle	C	N/A	OIU	M1DP47MDX111U	171				Nominal	In Alarm		2A +
CDH	Prime NCS Detected Vusy Bit Fail for SMCC - SM	C	SM	SMCC	M1DP47MDX019U	246				Nominal	In Alarm		2A.1 +
CDH	Prime NCS Detected Frame Count Fail for SMCC - SM	C	SM	SMCC	M1DP47MDX020U	247				Nominal	In Alarm		2A.1 +
CDH	Prime NCS Loss of Sync to SMCC - SM	C	SM	SMCC	M1DP47MDX021U	248				Nominal	In Alarm		2A.1 +
CDH	Prime NCS User Bus EPS N1-23 Fail - NOD1	A	PMA1	Prim NCS	M1DP47MDX014U	168				Nominal	In Alarm		2A +
CDH	Prime NCS User Bus EPS N1-14 Fail - NOD1	A	PMA1	Prim NCS	M1DP47MDX015U	169				Nominal	In Alarm		2A +
CDH	MDM N1-1 Loss of Sync to MDM N1-2 - PMA 1	A	PMA1	Nod1 2 MDM	M1DS47MDX011U	6				Nominal	In Alarm		2A +
CDH	MDM N1-1 Control Bus GNC 1 Fail - NOD1	A	PMA1	Nod1 1 MDM	M1DS47MDX013U	8				Nominal	In Alarm		2A +
CDH	MDM N1-1 Local Bus Sys Lab 1 Fail - NOD1	A	PMA1	Nod1 1 MDM	M1DS47MDX015U	10				Nominal	In Alarm		2A +
CDH	MDM N1-2 Operational Heater Failed - Node 1	A	PMA1	Nod1 1 MDM	M1DS47MDX301U	41	MDM N1-2 RTD2 Meas			< or = -45 deg F or > or = +120 deg F			2A +
CDH	MDM N1-2 Survival Heater Failed - Node 1	A	PMA1	Nod1 2 MDM	M1DS47MDX312U	52	MDM N1-2 RTD1 Meas			< or = -45 deg F or > or = +120 deg F			2A +

NCS C&amp;W EVENT TABLE

System	Message Text	Class	Element	SubSystem	P2 PUI	Event Code	Event Driver	Analog Limit Low	Analog Limit High	Discrete Value 0=	Discrete Value 1=	Limit Location PPL ID and/or Cmd	Flight Effectivity
CDH	MDM N1-2 Loss of Sync to MDM N1-1 - PMA 1	A	PMA1	Nod1 1 MDM	M1DS48MDX003U	66				Nominal	In Alarm		2A+
CDH	MDM N1-2 Control Bus GNC 2 Fail - NOD1	A	PMA1	Nod1 2 MDM	M1DS48MDX013U	76				Nominal	In Alarm		2A +
CDH	MDM N1-2 Local Bus Sys Lab 2 Fail - NOD1	A	PMA1	Nod1 2 MDM	M1DS48MDX015U	78				Nominal	In Alarm		2A +
CDH	MDM N1-1 Operational Heater Failed - NODE 1	A	PMA1	Nod1 2 MDM	M1DS48MDX303U	119	MDM N1-1 RTD2 Meas			< or = -45 deg F or > or = +120 deg F			2A +
CDH	MDM N1-1 Survival Heater Failed - Node 1	A	PMA1	Nod1 1 MDM	M1DS48MDX408U	132	MDM N1-1 RTD1 Meas			Nominal	< or = -45 deg F or > or = +120 deg F		2A +
CDH	TLM System Off - FGB	A	FGB	TLM	RFCC00MD0500J	257				Nominal	Failed		2A +
CDH	Prime NCS Loss of Sync to SMCC - SM	A	SM	SMCC	M1DP47MDX016U	249				Nominal	In Alarm		2A.1 +
CDH	Prime NCS Detected Busy Bit Fail for SMCC - SM	A	SM	SMCC	M1DP47MDX017U	250				Nominal	In Alarm		2A.1 +
CDH	Prime NCS Detected Frame Count Fail for SMCC - SM	A	FGB	SMCC	M1DP47MDX018U	251				Nominal	In Alarm		2A.1 +
ECL	Cabin Fan Fail - NOD1	W	NOD1	Nod1_Cab_Fan	M1DS47MDX209U	34	Node 1 Cab Fan Speed	< 3200 rpm (3X @ 1 Hz)	> 7000 rpm (3X @ 1 Hz)	N/A	N/A		2A +
ECL	Cabin Press Hi - NOD1	W	NOD1	Nod1_Cab_Press_Snsr	M1DS48MDX208U	103	Node 1 Cab Press	N/A	15.2 psia (3X @ 1 Hz)	N/A	N/A		2A +
ECL	Cabin Press Low - NOD1	W	NOD1	Nod1_Cab_Press_Snsr	M1DS48MDX209U	104	Node 1 Cab Press	13.9 psia (3X @ 1 Hz)	N/A	N/A	N/A		2A +
ECL	Cabin Press Low - FGB	W	FGB	FGB_Press_Snsr	RFEC00MD0007J	239	FGB WC Cab Press	TBD	N/A	N/A	N/A		2A +
ECL	Cabin Press Hi - FGB	W	FGB	FGB_Press_Snsr	RFEC00MD0008J	240	FGB WC Cab Press	N/A	TBD	N/A	N/A		2A +
ECL	FIRE - Smoke Detector Level 1 - FGB	W	FGB	FGB_SD	RFEC00MD0031J	255	FGB SDx Level 1	N/A	N/A	All FGB SD have Level 1 = blank (normal)	1+ FGB SD have Level 1 = X (In Alarm)		2A +

NCS C&amp;W EVENT TABLE

System	Message Text	Class	Element	SubSystem	P2 PUI	Event Code	Event Driver	Analog Limit Low	Analog Limit High	Discrete Value 0=	Discrete Value 1=	Limit Location PPL ID and/or Cmd	Flight Effectivity
ECL	FIRE - Smoke Detector 1 - NOD1	F	NOD1	Nod1_SD_1	M1DS47MDX210U	35	Node 1 SD 1 Sctr > Sctr Threshold 3X @ 1 Hz, with 3 second Active BIT between second and third measurements. Sctr Threshold = (Sctr Trip) * ((Obs+4.0v)/8.0v)	N/A	N/A	N/A	N/A		2A +
ECL	FIRE - Smoke Detector 2 - NOD1	F	NOD1	Nod1_SD_2	M1DS48MDX210U	105	Node 1 SD 2 Sctr > Sctr Threshold 3X @ 1 Hz, with 3 second Active BIT between second and third measurements. Sctr Threshold = (Sctr Trip) * ((Obs+4.0v)/8.0v)	N/A	N/A	N/A	N/A		2A +
ECL	FIRE - Smoke Detector Level 2 - FGB	F	FGB	FGB_SD	RFEC00MD0001J	241	FGB SDx Level 2	N/A	N/A	0 or 1 FGB SD have Level 2 = X (In Alarm)	2+ FGB SD have Level 2 = X (In Alarm)		2A +
ECL	IMV Aft Port Fan Fail Low - NOD1	C	NOD1	Nod1_Aft_Port_IM_V_Fan	M1DS47MDX201U	27	IMV Aft Port Fan Spd	<7462 rpm (3X)	N/A	N/A	N/A		2A +
ECL	IMV Aft Port Fan Fail Hi - NOD1	C	NOD1	Nod1_Aft_Port_IM_V_Fan	M1DS47MDX202U	28	IMV Aft Port Fan Spd	> 9500 rpm (3X)	N/A	N/A	N/A		2A +
ECL	IMV Aft Port Vlv Fail - NOD1	C	NOD1	Nod1_Aft_Port_IM_V_Vlv	M1DS47MDX203U	29	IMV Aft Port Vlv Status ≠ commanded position after 20 seconds.	N/A	N/A	N/A	N/A		2A +
ECL	IMV Aft Stbd Vlv Fail - NOD1	C	NOD1	Nod1_Aft_Stbd_IM_V_Vlv	M1DS47MDX204U	30	IMV Aft Stbd Vlv Status ≠ commanded position after 20 seconds.	N/A	N/A	N/A	N/A		2A +
ECL	IMV Port Fwd Vlv Fail - NOD1	C	NOD1	Nod1_Port_Fwd_IM_V_Vlv	M1DS47MDX205U	31	IMV Port Fwd Vlv Status ≠ commanded position after 20 seconds.	N/A	N/A	N/A	N/A		2A +
ECL	IMV Stbd Aft Vlv Fail - NOD1	C	NOD1	Nod1_Stbd_Aft_IM_V_Vlv	M1DS47MDX206U	32	IMV Stbd Aft Vlv Status ≠ commanded position after 20 seconds.	N/A	N/A	N/A	N/A		2A +
ECL	IMV Stbd Fwd Vlv Fail - NOD1	C	NOD1	Nod1_Stbd_Fwd_IM_V_Vlv	M1DS47MDX207U	33	IMV Stbd Fwd Vlv Status ≠ commanded position after 20 seconds.	N/A	N/A	N/A	N/A		2A +

## NCS C&amp;W EVENT TABLE

System	Message Text	Class	Element	SubSystem	P2 PUI	Event Code	Event Driver	Analog Limit Low	Analog Limit High	Discrete Value 0=	Discrete Value 1=	Limit Location PPL ID and/or Cmd	Flight Effectivity
ECL	Smoke Detector 1 Active BIT Fail - NOD1	C	NOD1	Nod1_SD_1	M1DS47MDX211U	36	SD 1 Active BIT in Progress and one of the following: Sctr > 6.89 % obsc/mtr or Sctr < 2.95 %obsc/mtr during LED phase, Sctr > 0.82 % obsc/mtr or Sctr < -0.328 % obsc/mtr during QUIET phase, or Obsc > 97.5% contam in either phase.	N/A	N/A	N/A	N/A		2A +
ECL	Smoke Detector 1 Lens Contamination - NOD1	C	NOD1	Nod1_SD_1	M1DS47MDX213U	38	SD 1 Obsc > 45% contam (3X)	N/A	N/A	N/A	N/A		2A +
ECL	RAMV Fail - NOD1	C	NOD1	Nod1_RAMV	M1DS47MDX215U	40	Node 1 RAMV Status is more than $\pm$ 5 degrees from desired position after 30 seconds.	N/A	N/A	N/A	N/A		2A +
ECL	IMV Deck Fwd Vlv Fail - NOD1	C	NOD1	Nod1_Deck_Fwd_IMV_Vlv	M1DS48MDX204U	99	IMV Deck Fwd Vlv Status $\neq$ commanded position after 20 seconds.	N/A	N/A	N/A	N/A		2A +
ECL	IMV Deck Aft Vlv Fail - NOD1	C	NOD1	Nod1_Deck_Aft_IMV_Vlv	M1DS48MDX205U	100	IMV Deck Aft Vlv Status $\neq$ commanded position after 20 seconds.	N/A	N/A	N/A	N/A		2A +
ECL	IMV Fwd Stbd Vlv Fail - NOD1	C	NOD1	Nod1_Fwd_Stbd_IMV_Vlv	M1DS48MDX206U	101	IMV Fwd Stbd Vlv Status $\neq$ commanded position after 20 seconds.	N/A	N/A	N/A	N/A		2A +
ECL	IMV Fwd Port Vlv Fail - NOD1	C	NOD1	Nod1_Fwd_Port_IMV_Vlv	M1DS48MDX207U	102	IMV Fwd Port Vlv Status $\neq$ commanded position after 20 seconds.	N/A	N/A	N/A	N/A		2A +

## NCS C&amp;W EVENT TABLE

System	Message Text	Class	Element	SubSystem	P2 PUI	Event Code	Event Driver	Analog Limit Low	Analog Limit High	Discrete Value 0=	Discrete Value 1=	Limit Location PPL ID and/or Cmd	Flight Effectivity
ECL	Smoke Detector 2 Active BIT Fail - NOD1	C	NOD1	Nod1_SD_2	M1DS48MDX211U	106	SD 2 Active BIT in Progress and one of the following: Sctr > 6.89 % obsc/mtr or Sctr < 2.95 %obsc/mtr during LED phase, Sctr > 0.82 % obsc/mtr or Sctr < -0.328 % obsc/mtr during QUIET phase, or Obsc > 97.5% contam in either phase.	N/A	N/A	N/A	N/A		2A +
ECL	Smoke Detector 2 Lens Contamination - NOD1	C	NOD1	Nod1_SD_2	M1DS48MDX213U	108	SD 1 Obsc > 45% contam (3X)	N/A	N/A	N/A	N/A		2A +
ECL	Cupola RAMV Fail - NOD1	C	NOD1	Nod1_Cup_RAMV	M1DS48MDX215U	110	CUP RAMV Status is more than $\pm$ 5 degrees from desired position after 30 seconds.	N/A	N/A	N/A	N/A		2A +
ECL	Smoke Detector 2 Fail - NOD1	C	NOD1	Nod1_SD_2	M1DS48MDX212U	107	SD 1 Sctr < -0.328 % obs/mtr or SD obsc > 50% contam or SD obsc < -2.5 % contam (2X for each event)	N/A	N/A	N/A	N/A		2A +
ECL	IMV Stbd Aft Fan Fail Low - NOD1	C	NOD1	Nod1_Stbd_Aft_IMV_Fan	M1DS48MDX202U	97	IMV Stbd Aft Fan Spd	< 7462 rpm (3X)	N/A	N/A	N/A		2A +
ECL	IMV Port Fwd Fan Fail Low - NOD1	C	NOD1	Nod1_Port_Fwd_IMV_Fan	M1DS48MDX200U	95	IMV Port Fwd Fan Spd	< 7462 rpm (3X)	N/A	N/A	N/A		2A +
ECL	IMV Stbd Aft Fan Fail Hi - NOD1	C	NOD1	Nod1_Stbd_Aft_IMV_Fan	M1DS48MDX203U	98	IMV Stbd Aft Fan Spd	> 9500 rpm (3X)	N/A	N/A	N/A		2A +
ECL	IMV Port Fwd Fan Fail Hi - NOD1	C	NOD1	Nod1_Port_Fwd_IMV_Fan	M1DS48MDX201U	96	IMV Port Fwd Fan Spd	> 9500 rpm (3X)	N/A	N/A	N/A		2A +
ECL	Smoke Detector 1 Fail - NOD1	C	NOD1	Nod1_SD_1	M1DS47MDX212U	37	SD 1 Sctr < -0.328 % obs/mtr or SD obsc > 50% contam or SD obsc < -2.5 % contam (2X for each event)	N/A	N/A	N/A	N/A		2A +
ECL	IMV Aft Port Fan FDIR Inhib - NOD1	A	NOD1	Nod1_Aft_Port_IMV_Fan	M1DS47MDX214U	39	Receipt of IMV Aft Port Fan FDIR Inh and Inh Cfrm cmd and IMV_Aft_Port_Fan_Status = Inh	N/A	N/A	N/A	N/A		2A +
ECL	IMV Stbd Aft Fan FDIR Inhib - NOD1	A	NOD1	Nod1_Stbd_Aft_IMV_Fan	M1DS48MDX214U	109	Receipt of IMV Stbd Aft Fan FDIR Inh and Inh Cfrm cmd and IMV_Stbd_Aft_Fan_Status = Inh	N/A	N/A	N/A	N/A		2A +

## NCS C&amp;W EVENT TABLE

System	Message Text	Class	Element	SubSystem	P2 PUI	Event Code	Event Driver	Analog Limit Low	Analog Limit High	Discrete Value 0=	Discrete Value 1=	Limit Location PPL ID and/or Cmd	Flight Effectivity
ECL	INVALID - FIRE - Smoke Detector Level 2 - FGB	A	FGB	FGB_SD	RFEC00MD0030J	252	FGB_Fire_Valid_CW set to INVALID. This can be done by <b>MCC-M</b> to indicate bad data feeding this alarm, or by the FGB MDM receiving a bad status indicator for the data message containing this event.	N/A	N/A	Valid	Invalid		2A +
ECL	INVALID - FIRE - Smoke Detector Level 1 - FGB	A	FGB	FGB_SD	RFEC00MD0029J	253	FGB_Smoke_Valid_CW set to INVALID. This can be done by <b>MCC-M</b> to indicate bad data feeding this alarm, or by the FGB MDM receiving a bad status indicator for the data message containing this event.	N/A	N/A	Valid	Invalid		2A +
ECL	INVALID - Cab Press Hi - FGB	A	FGB	FGB_Press_Snsr	RFEC00MD0012J	254	FGB_Cab_Press_UL_VI ol_Valid_CW set to INVALID. This can be done by <b>MCC-M</b> to indicate bad data feeding this alarm, or by the FGB MDM receiving a bad status indicator for the data message containing this event.	N/A	N/A	Valid	Invalid		2A +
ECL	IMV Port Fwd Fan FDIR Inhib - NOD1	A	NOD1	Nod1_Port_Fwd_IMV_Fan	M1DS48MDX302U	245	Receipt of IMV Port Fwd Fan FDIR Inh and Inh Cfrm cmd and IMV_Port_Fwd_Fan_Status = Inh	N/A	N/A	N/A	N/A		2A +

## NCS C&amp;W EVENT TABLE

System	Message Text	Class	Element	SubSystem	P2 PUI	Event Code	Event Driver	Analog Limit Low	Analog Limit High	Discrete Value 0=	Discrete Value 1=	Limit Location PPL ID and/or Cmd	Flight Effectivity
ECL	INVALID - Cab Press Low - FGB	A	FGB	FGB_Press_Snsr	RFEC00MD0011J	256	FGB_Cab_Press_LL_Viol_Valid_CW set to INVALID. This can be done by MCC-M to indicate bad data feeding this alarm, or by the FGB MDM receiving a bad status indicator for the data message containing this event.	N/A	N/A	Valid	Invalid		2A +
ECL	Air Temp Hi - FGB	A	FGB	N/A (alarm covers all temps)	RFTC00MD0004J	258	TBD	N/A	TBD	N/A	N/A		2A +
ECL	Air Temp Low - FGB	A	FGB	N/A (alarm covers all temps)	RFTC00MD0003J	259	TBD	TBD	N/A	N/A	N/A		2A +
EPS	FGB Power Utilization Violation - Load Shed Initiated - NOD1	C	FGB	FGB_Batt	M1DP47MDX110U	170	Low voltage on 3 FGB Batteries			Volts < or = 25.5	Volts > 25.5		
EPS	RPCM N1RS1_C Loss of Comm - NOD1	A	NOD1	RPCM N1RS1_C	M1DP47MDX202U	178	Intgrtn_Ctr N1PN11FC0617U			Static	Incre-menting		
EPS	RPCM N1RS1_B Loss of Comm - NOD1	A	NOD1	RPCM N1RS1_B	M1DP47MDX203U	179	Intgrtn_Ctr N1PN10FC0617U			Static	Incre-menting		
EPS	RPCM N1RS1_A Loss of Comm - NOD1	A	NOD1	RPCM N1RS1_A	M1DP47MDX204U	180	Intgrtn_Ctr N1PN09FC0617U			Static	Incre-menting		
EPS	RPCM N1RS2_C Loss of Comm - NOD1	A	NOD1	RPCM N1RS2_C	M1DP47MDX207U	183	Intgrtn_Ctr N1PN15FC0617U			Static	Incre-menting		
EPS	RPCM N1RS2_B Loss of Comm - NOD1	A	NOD1	RPCM N1RS2_B	M1DP47MDX208U	184	Intgrtn_Ctr N1PN14FC0617U			Static	Incre-menting		
EPS	RPCM N1RS2_A Loss of Comm - NOD1	A	NOD1	RPCM N1RS2_A	M1DP47MDX209U	185	Intgrtn_Ctr N1PN13FC0617U			Static	Incre-menting		
EPS	RPCM N1RS1_C Trip - NOD1	A	NOD1	RPCM N1RS1_C	M1DP47MDX302U	194	RPCM_N1RS1_C_RPC _XX_Trip_Stat,RPCM_N1RS1_C_Undvolt_Trip_Awaitg_Rcvy, RPCM_N1RS1_C_Undvolt_Trip						
EPS	RPCM N1RS1_B Trip - NOD1	A	NOD1	RPCM N1RS1_B	M1DP47MDX303U	195	RPCM_N1RS1_B_RPC _XX_Trip_Stat,RPCM_N1RS1_B_Undvolt_Trip_Awaitg_Rcvy, RPCM_N1RS1_B_Undvolt_Trip						

NCS C&amp;W EVENT TABLE

System	Message Text	Class	Element	SubSystem	P2 PUI	Event Code	Event Driver	Analog Limit Low	Analog Limit High	Discrete Value 0=	Discrete Value 1=	Limit Location PPL ID and/or Cmd	Flight Effectivity
EPS	RPCM N1RS1_A Trip - NOD1	A	NOD1	RPCM N1RS1_A	M1DP47MDX304U	196	RPCM_N1RS1_A_RPC_XX_Trip_Stat,RPCM_N1RS1_A_Undvolt_Trip_Awaitg_Rcvy, RPCM_N1RS1_A_Undvolt_Trip						
EPS	RPCM N1RS2_C Trip - NOD1	A	NOD1	RPCM N1RS2_C	M1DP47MDX307U	199	RPCM_N1RS2_C_RPC_XX_Trip_Stat,RPCM_N1RS2_C_Undvolt_Trip_Awaitg_Rcvy, RPCM_N1RS2_C_Undvolt_Trip			nominal	Trip		
EPS	RPCM N1RS2_B Trip - NOD1	A	NOD1	RPCM N1RS2_B	M1DP47MDX308U	200	RPCM_N1RS2_B_RPC_XX_Trip_Stat,RPCM_N1RS2_B_Undvolt_Trip_Awaitg_Rcvy, RPCM_N1RS2_B_Undvolt_Trip						
EPS	RPCM N1RS2_A Trip - NOD1	A	NOD1	RPCM N1RS2_A	M1DP47MDX309U	201	RPCM_N1RS2_A_RPC_XX_Trip_Stat,RPCM_N1RS2_A_Undvolt_Trip_Awaitg_Rcvy, RPCM_N1RS2_A_Undvolt_Trip						
EPS	RPCM N14B_C Trip - NOD1	A	NOD1	RPCM N14B_C	M1DS47MDX102U	13	RPCM_N14B_C_RPC_XX_Trip_Stat,RPCM_N14B_C_Undvolt_Trip_Awaitg_Rcvy, RPCM_N14B_C_Undvolt_Trip			nominal	Trip		
EPS	RPCM N14B_B Trip - NOD1	A	NOD1	RPCM N14B_B	M1DS47MDX103U	14	RPCM_N14B_B_RPC_XX_Trip_Stat,RPCM_N14B_B_Undvolt_Trip_Awaitg_Rcvy, RPCM_N14B_B_Undvolt_Trip			nominal	Trip		
EPS	RPCM N14B_A Trip - NOD1	A	NOD1	RPCM N14B_A	M1DS47MDX104U	15	RPCM_N14B_A_RPC_XX_Trip_Stat,RPCM_N14B_A_Undvolt_Trip_Awaitg_Rcvy, RPCM_N14B_A_Undvolt_Trip			nominal	Trip		
EPS	RPCM N14B_C Loss of Comm - NOD1	A	NOD1	RPCM N14B_C	M1DS47MDX107U	18	Intgrtn_Ctr N1PN07FC0617U			Static	Incre-menting		
EPS	RPCM N14B_B Loss of Comm - NOD1	A	NOD1	RPCM N14B_B	M1DS47MDX108U	19	Intgrtn_Ctr N1PN06FC0617U			Static	Incre-menting		

NCS C&W EVENT TABLE

System	Message Text	Class	Element	SubSystem	P2 PUI	Event Code	Event Driver	Analog Limit Low	Analog Limit High	Discrete Value 0=	Discrete Value 1=	Limit Location PPL ID and/or Cmd	Flight Effectivity
EPS	RPCM N14B_A Loss of Comm - NOD1	A	NOD1	RPCM N14B_A	M1DS47MDX109U	20	Intgrtn_Ctr N1PN05FC0617U			Static	Incre-menting		
EPS	RPCM N13B_C Trip - NOD1	A	NOD1	RPCM N13B_C	M1DS48MDX102U	81	RPCM_N13B_C_RPC_XX_Trip_Stat,RPCM_N13B_C_Undvolt_Trip_Aw aitg_Rcvy, RPCM_N13B_C_Undvolt_Trip			nominal	Trip		
EPS	RPCM N13B_B Trip - NOD1	A	NOD1	RPCM N13B_B	M1DS48MDX103U	82	RPCM_N13B_B_RPC_XX_Trip_Stat,RPCM_N13B_B_Undvolt_Trip			nominal	Trip		
EPS	RPCM N13B_A Trip - NOD1	A	NOD1	RPCM N13B_A	M1DS48MDX104U	83	RPCM_N13B_A_RPC_XX_Trip_Stat,RPCM_N13B_A_Undvolt_Trip			nominal	Trip		
EPS	RPCM N13B_C Loss of Comm - NOD1	A	NOD1	RPCM N13B_C	M1DS48MDX107U	86	Intgrtn_Ctr N1PN03FC0617U			Static	Incre-menting		
EPS	RPCM N13B_B Loss of Comm - NOD1	A	NOD1	RPCM N13B_B	M1DS48MDX108U	87	Intgrtn_Ctr N1PN02FC0617U			Static	Incre-menting		
EPS	RPCM N13B_A Loss of Comm - NOD1	A	NOD1	RPCM N13B_A	M1DS48MDX109U	88	Intgrtn_Ctr N1PN01FC0617U			Static	Incre-menting		
EPS	SPDA Z13B Heater A Failed - Z1	A	Z1	HTR	M1DS47MDX400U	56							3A +
EPS	SPDA Z14B Heater A Failed - Z1	A	Z1	HTR	M1DS47MDX401U	57							3A +
EPS	SPDA Z13B Heater B Failed - Z1	A	Z1	HTR	M1DS48MDX410U	134							3A +
EPS	SPDA Z14B Heater B Failed - Z1	A	Z1	HTR	M1DS48MDX411U	135							3A +
EPS	RPCM Z14B_B Loss of Comm - Z1	A	Z1	RPCM Z14B_B	M1DP47MDX200U	176							3A +
EPS	RPCM Z14B_A Loss of Comm - Z1	A	Z1	RPCM Z14B_A	M1DP47MDX201U	177							3A +
EPS	RPCM Z13B_B Loss of Comm - Z1	A	Z1	RPCM Z13B_B	M1DP47MDX205U	181							3A +
EPS	RPCM Z13B_A Loss of Comm - Z1	A	Z1	RPCM Z13B_A	M1DP47MDX206U	182							3A +
EPS	RPCM Z14B_B Trip - Z1	A	Z1	RPCM Z14B_B	M1DP47MDX300U	192							3A +
EPS	RPCM Z14B_A Trip - Z1	A	Z1	RPCM Z14B_A	M1DP47MDX301U	193							3A +
EPS	RPCM Z13B_B Trip - Z1	A	Z1	RPCM Z13B_B	M1DP47MDX305U	197							3A +
EPS	RPCM Z13B_A Trip - Z1	A	Z1	RPCM Z13B_A	M1DP47MDX306U	198							3A +
EPS	RPCM LAB1D1_F_A Trip - Lab	A	LAB	LAB1D1_F_A	M1DS47MDX100U	11							3A +
EPS	RPCM LF_A Trip - Lab	A	LAB	RPCM LF_A	M1DS47MDX101U	12							3A +
EPS	RPCM LAB1D1_F_A Loss of Comm - Lab	A	LAB	RPCM LAB1D1_F_A	M1DS47MDX105U	16							3A +
EPS	RPCM LF_A Loss of Comm - Lab	A	LAB	RPCM LF_A	M1DS47MDX106U	17							3A +
EPS	RPCM LAB1D5_A_A Trip - Lab	A	LAB	RPCM LAB1D5_A_A	M1DS48MDX100U	79							3A +

NCS C&amp;W EVENT TABLE

System	Message Text	Class	Element	SubSystem	P2 PUI	Event Code	Event Driver	Analog Limit Low	Analog Limit High	Discrete Value 0=	Discrete Value 1=	Limit Location PPL ID and/or Cmd	Flight Effectivity
EPS	RPCM LA_A Trip - Lab	A	LAB	RPCM LA_A	M1DS48MDX101U	80							3A +
EPS	RPCM LAB1D5_A_A Loss of Comm - Lab	A	LAB	RPCM LAB1D5_A_A	M1DS48MDX105U	84							3A +
EPS	RPCM LA_A Loss of Comm - Lab	A	LAB	RPCM LA_A	M1DS48MDX106U	85							3A +
SNM	CBM-Rapid-Safing-Failure - NOD1	C	NOD1	CBM	M1DP47MDX112U	172	CBM Rapid Safing Fails to complete.			Normal	Tripped		2A +
SNM	CBM-Rapid-Safing-in-Progress - NOD1	C	NOD1	CBM	M1DP47MDX113U	173	CBM Rapid Safing command issued.			Normal	Tripped		2A +
SNM	CBM FORWARD Primary RT Fail - NOD1	A	NOD1	CBM	M1DS47MDX006U	1	MDM to RT Communication Failure			Normal	Tripped		2A +
SNM	CBM PORT Primary RT Fail - NOD1	A	NOD1	CBM	M1DS47MDX007U	2	MDM to RT Communication Failure			Normal	Tripped		2A +
SNM	CBM DECK Primary RT Fail - NOD1	A	NOD1	CBM	M1DS47MDX008U	3	MDM to RT Communication Failure			Normal	Tripped		2A +
SNM	CBM STARBOARD Primary RT Fail - NOD1	A	NOD1	CBM	M1DS47MDX009U	4	MDM to RT Communication Failure			Normal	Tripped		2A +
SNM	CBM ZENITH Primary RT Fail - NOD1	A	NOD1	CBM	M1DS47MDX010U	5	MDM to RT Communication Failure			Normal	Tripped		2A +
SNM	CBM FORWARD Secondary RT Fail - NOD1	A	NOD1	CBM	M1DS48MDX005U	68	MDM to RT Communication Failure			Normal	Tripped		2A +
SNM	CBM PORT Secondary RT Fail - NOD1	A	NOD1	CBM	M1DS48MDX006U	69	MDM to RT Communication Failure			Normal	Tripped		2A +
SNM	CBM DECK Secondary RT Fail - NOD1	A	NOD1	CBM	M1DS48MDX007U	70	MDM to RT Communication Failure			Normal	Tripped		2A +
SNM	CBM STARBOARD Secondary RT Failure - NOD1	A	NOD1	CBM	M1DS48MDX008U	71	MDM to RT Communication Failure			Normal	Tripped		2A +
SNM	CBM ZENITH Secondary RT Fail - NOD1	A	NOD1	CBM	M1DS48MDX009U	72	MDM to RT Communication Failure			Normal	Tripped		2A +
TCS	Node 1 Heater 1A Failed - Node 1	A	NOD1	HTR	M1DS47MDX302U	42							
TCS	Node 1 Heater 2A Failed - Node 1	A	NOD1	HTR	M1DS47MDX303U	43							
TCS	Node 1 Heater 3A Failed - Node 1	A	NOD1	HTR	M1DS47MDX304U	44							
TCS	Node 1 Heater 4A Failed - Node 1	A	NOD1	HTR	M1DS47MDX305U	45							
TCS	Node 1 Heater 5A Failed - Node 1	A	NOD1	HTR	M1DS47MDX306U	46							
TCS	Node 1 Heater 6A Failed - Node 1	A	NOD1	HTR	M1DS47MDX307U	47							
TCS	Node 1 Heater 7A Failed - Node 1	A	NOD1	HTR	M1DS47MDX308U	48							
TCS	Node 1 Heater 8A Failed - Node 1	A	NOD1	HTR	M1DS47MDX309U	49							
TCS	Node 1 Heater 9A Failed - Node 1	A	NOD1	HTR	M1DS47MDX310U	50							
TCS	PMA1 Heater 1A Failed - PMA1	A	PMA1	HTR	M1DS47MDX311U	51							
TCS	PMA1 Heater 3A Failed - PMA1	A	PMA1	HTR	M1DS47MDX313U	53							
TCS	PMA1 Heater 4A Failed - PMA1	A	PMA1	HTR	M1DS47MDX314U	54							
TCS	PMA1 Heater 5A Failed - PMA1	A	PMA1	HTR	M1DS47MDX315U	55							
TCS	Cupola Win Heater 7A Failed - Cupola	A	CUP	HTR	M1DS48MDX304U	111							
TCS	Cupola Win Heater 7B Failed - Cupola	A	CUP	HTR	M1DS48MDX305U	112							

NCS C&amp;W EVENT TABLE

System	Message Text	Class	Element	SubSystem	P2 PUI	Event Code	Event Driver	Analog Limit Low	Analog Limit High	Discrete Value 0=	Discrete Value 1=	Limit Location PPL ID and/or Cmd	Flight Effectivity
TCS	Cupola Win Heater 1A Failed - Cupola	A	CUP	HTR	M1DS48MDX306U	113							
TCS	Cupola Win Heater 2A Failed - Cupola	A	CUP	HTR	M1DS48MDX307U	114							
TCS	Cupola Win Heater 3A Failed - Cupola	A	CUP	HTR	M1DS48MDX308U	115							
TCS	Cupola Win Heater 4A Failed - Cupola	A	CUP	HTR	M1DS48MDX309U	116							
TCS	Cupola Win Heater 5A Failed - Cupola	A	CUP	HTR	M1DS48MDX310U	117							
TCS	Cupola Win Heater 6A Failed - Cupola	A	CUP	HTR	M1DS48MDX311U	118							
TCS	Node 1 Heater 1B Failed - Node 1	A	NOD1	HTR	M1DS48MDX312U	120							
TCS	Node 1 Heater 2B Failed - Node 1	A	NOD1	HTR	M1DS48MDX313U	121							
TCS	Node 1 Heater 3B Failed - Node 1	A	NOD1	HTR	M1DS48MDX314U	122							
TCS	Node 1 Heater 4B Failed - Node 1	A	NOD1	HTR	M1DS48MDX315U	123							
TCS	Node 1 Heater 5B Failed - Node 1	A	NOD1	HTR	M1DS48MDX400U	124							
TCS	Node 1 Heater 6B Failed - Node 1	A	NOD1	HTR	M1DS48MDX401U	125							
TCS	Node 1 Heater 7B Failed - Node 1	A	NOD1	HTR	M1DS48MDX402U	126							
TCS	Node 1 Heater 8B Failed - Node 1	A	NOD1	HTR	M1DS48MDX403U	127							
TCS	Node 1 Heater 9B Failed - Node 1	A	NOD1	HTR	M1DS48MDX404U	128							
TCS	PMA1 Heater 1B Failed - PMA1	A	PMA1	HTR	M1DS48MDX405U	129							
TCS	PMA1 Heater 2B Failed - PMA1	A	PMA1	HTR	M1DS48MDX406U	130							
TCS	PMA1 Heater 3B Failed - PMA1	A	PMA1	HTR	M1DS48MDX407U	131							
TCS	PMA1 Heater 5B Failed - PMA1	A	PMA1	HTR	M1DS48MDX409U	133							
TCS	PMA3 Heater 1A Failed - PMA3	A	PMA3	HTR	M1DS48MDX500U	136							
TCS	PMA3 Heater 2A Failed - PMA3	A	PMA3	HTR	M1DS48MDX501U	137							
TCS	PMA3 Heater 3A Failed - PMA3	A	PMA3	HTR	M1DS48MDX502U	138							
TCS	PMA3 Heater 4A Failed - PMA3	A	PMA3	HTR	M1DS48MDX503U	139							
TCS	PMA3 Heater 5A Failed - PMA3	A	PMA3	HTR	M1DS48MDX504U	140							
TCS	PMA3 Heater 1B Failed - PMA3	A	PMA3	HTR	M1DS48MDX505U	141							
TCS	PMA3 Heater 2B Failed - PMA3	A	PMA3	HTR	M1DS48MDX506U	142							
TCS	PMA3 Heater 3B Failed - PMA3	A	PMA3	HTR	M1DS48MDX507U	143							
TCS	PMA3 Heater 4B Failed - PMA3	A	PMA3	HTR	M1DS48MDX508U	144							
TCS	PMA3 Heater 5B Failed - PMA3	A	PMA3	HTR	M1DS48MDX509U	145							

### N1-1 MDM Channel Assignments

Name	Description	MDM	Card Refdes	Card Type	Slot No.	Chanl No.	Chanl Type	ISS Element	OPS Position	Flight Activation	Flight Deactivation
HX Lab LT-A Inl V Norm Fl Pos	Lab LT-A HX Inlet Byp Vlv Norm Flow Pos Ind	N1-1	A09	DIO	SL02	CH00	A	Lab	ECLSS	5A	12A
HX Lab LT-A Inl V Byp Fl Pos	Lab LT-A HX Inlet Byp Vlv Byp Flow Pos	N1-1	A09	DIO	SL02	CH01	A	Lab	ECLSS	5A	12A
HX Lab LT-A Out V Open Pos	Lab LT-A HX Outlet Isln/Rlf Vlv Open Pos Ind	N1-1	A09	DIO	SL02	CH02	B	Lab	ECLSS	5A	12A
HX Lab LT-A Out V Cls Pos	Lab LT-A HX Outlet Isln/Rlf Vlv Cls Pos Ind	N1-1	A09	DIO	SL02	CH03	B	Lab		5A	12A
Smk Det N1-1 Bit Enbl	Node-1 Smk Det-1 Bit Enbl	N1-1	A09	DIO	SL02	CH04	B	Node-1		2A	AC
VAV Dmpr N1-N1 EnableCmd	Node-1 Air Mix Vlv Enable Cmd	N1-1	A09	DIO	SL02	CH05	A	Node-1	ECLSS	2A	AC
IMV Fan N1-Aft Rtn On/Off Cmd	Node-1 Aft IMV Fan On/Off Cmd	N1-1	A09	DIO	SL02	CH06	A	Node-1	ECLSS	2A	AC
Cab Vent Fan N1 On/Off Cmd	Node-1 Cabin Fan On/Off Cmd	N1-1	A09	DIO	SL02	CH07	A	Node-1	ECLSS	2A	AC
TWV N1-1 Pos A	Node-1 3-Way SDS Vlv-1 Pos A	N1-1	A09	DIO	SL02	CH08	A	Node-1	?	2A	AC
TWV N1-1 Pos B	Node-1 3-Way SDS Vlv-1 Pos B	N1-1	A09	DIO	SL02	CH09	A	Node-1	?	2A	AC
TWV N1-2 Pos A	Node-1 3-Way SDS Vlv-2 PosA	N1-1	A09	DIO	SL02	CH10	B	Node-1	?	2A	AC
TWV N1-2 Pos B	Node-1 3-Way SDS Vlv-2 Pos B	N1-1	A09	DIO	SL02	CH11	B	Node-1	?	2A	AC
TWV N1-3 Pos A	Node-1 3-Way SDS Vlv-3 Pos A	N1-1	A09	DIO	SL02	CH12	B	Node-1	?	2A	AC
TWV N1-3 Pos B	Node-1 3-Way SDS Vlv-3 Pos B	N1-1	A09	DIO	SL02	CH13	A	Node-1	?	2A	AC
TWV N1-4 Pos A	Node-1 3-Way SDS Vlv 4 PosA	N1-1	A09	DIO	SL02	CH14	A	Node-1	?	2A	AC
TWV N1-4 Pos B	Node-1 3-Way SDS Vlv-4 Pos B	N1-1	A09	DIO	SL02	CH15	A	Node-1	?	2A	AC
IMV V N1-Aft Rtn Cls Pos	Node-1 Aft Rtn IMV Vlv Cls Pos	N1-1	A09	DIO	SL02	CH16	A	Node-1	ECLSS	2A	AC
IMV V N1-Aft Rtn Enbl Cmd	Node-1 Aft Rtn IMV Vlv Enable Cmd	N1-1	A09	DIO	SL02	CH17	A	Node-1	ECLSS	2A	AC
IMV V N1-Aft Rtn Open Pos	Node-1 Aft Rtn IMV Vlv Open Pos	N1-1	A09	DIO	SL02	CH18	B	Node-1	ECLSS	2A	AC
IMV V N1-Aft Sply Open Pos	Node-1 Aft Sply IMV Vlv Open Pos	N1-1	A09	DIO	SL02	CH19	B	Node-1	ECLSS	2A	AC
IMV V N1-Aft Sply Cls Pos	Node-1 Aft Sply IMV Vlv Cls Pos	N1-1	A09	DIO	SL02	CH20	B	Node-1	ECLSS	2A	AC
IMV V N1-Aft Sply Enbl Cmd	Node-1 Aft Sply IMV Vlv Enable Cmd	N1-1	A09	DIO	SL02	CH21	A	Node-1	ECLSS	2A	AC
IMV V N1-Port Sply Open Pos	Node-1 Port Sply IMV Vlv Open Pos	N1-1	A09	DIO	SL02	CH22	A	Node-1	ECLSS	2A	AC
IMV V N1-Port Sply Cls Pos	Node-1 Port Sply IMV Vlv Cls Pos	N1-1	A09	DIO	SL02	CH23	A	Node-1	ECLSS	2A	AC
IMV V N1-Port Sply Enbl Cmd	Node-1 Port Sply IMV Vlv Enable Cmd	N1-1	A09	DIO	SL02	CH24	A	Node-1	ECLSS	2A	AC
IMV V N1-Stbd Rtn Enbl Cmd	Node-1 Stbd Rtn IMV Vlv Enable Cmd	N1-1	A09	DIO	SL02	CH25	A	Node-1	ECLSS	2A	AC
IMV V N1-Stbd Rtn Open Pos	Node-1 Stbd Rtn IMV Vlv Open Pos	N1-1	A09	DIO	SL02	CH26	B	Node-1	ECLSS	2A	AC
IMV V N1-Stbd Rtn Cls Pos	Node-1 Stbd Rtn IMV Vlv Cls Pos	N1-1	A09	DIO	SL02	CH27	B	Node-1	ECLSS	2A	AC
IMV V N1-Stbd Sply Open Pos	Node-1 Stbd Sply IMV Vlv Open Pos	N1-1	A09	DIO	SL02	CH28	B	Node-1	ECLSS	2A	AC
IMV V N1-Stbd Sply Cls Pos	Node-1 Stbd Sply IMV Vlv Cls Pos	N1-1	A09	DIO	SL02	CH29	A	Node-1	ECLSS	2A	AC
IMV V N1-Stbd Sply Enbl Cmd	Node-1 Stbd Sply IMV Vlv Enable Cmd	N1-1	A09	DIO	SL02	CH30	A	Node-1	ECLSS	2A	AC
SPARE	SPARE	N1-1	A09	DIO	SL02	CH31	SPARE	SPARE	SPARE		
SSMDM N1-2 Htr Pwr	MDM PMAI-2 Htr Pwr	N1-1	A05	SDO	SL03	CH00	n/a	PMA-1	TCS	2A	AC
HX Lab LT-A Inl V Norm Fl Cmd	Lab LT-A HX Inlet Byp Vlv Norm Flow Cmd	N1-1	A05	SDO	SL03	CH01	n/a	Lab	ECLSS	5A	12A
HX Lab LT-A Inl V Byp Fl Cmd	Lab LT-A HX Inlet Byp Vlv Byp Flow Cmd	N1-1	A05	SDO	SL03	CH02	n/a	Lab	ECLSS	5A	12A
HX Lab LT-A Out V Open Cmd	Lab LT-A HX Outlet Isln/Rlf Vlv Open Cmd	N1-1	A05	SDO	SL03	CH03	n/a	Lab	ECLSS	5A	12A
HX Lab LT-A Out V Cls Cmd	Lab LT-A HX Outlet Isln/Rlf Vlv Cls Cmd	N1-1	A05	SDO	SL03	CH04	n/a	Lab	ECLSS	5A	12A
TWV N1-1 Solenoid Cmd	Node-1 3-Way SDS Vlv-1 Solenoid Cmd	N1-1	A05	SDO	SL03	CH05	n/a	Node-1	?	2A	AC
TWV N1-1 Latch Cmd	Node-1 3-Way SDS Vlv-1 Latch Cmd	N1-1	A05	SDO	SL03	CH06	n/a	Node-1	?	2A	AC

### N1-1 MDM Channel Assignments

Name	Description	MDM	Card Refdes	Card Type	Slot No.	Chanl No.	Chanl Type	ISS Element	OPS Position	Flight Activation	Flight Deactivation
TWV N1-2 Solenoid Cmd	Node-1 3-Way SDS Vlv-2 Solenoid Cmd	N1-1	A05	SDO	SL03	CH07	n/a	Node-1	?	2A	AC
TWV N1-2 Latch Cmd	Node-1 3-Way SDS Vlv-2 Latch Cmd	N1-1	A05	SDO	SL03	CH08	n/a	Node-1	?	2A	AC
TWV N1-3 Solenoid Cmd	Node-1 3-Way SDS Vlv-3 Solenoid Cmd	N1-1	A05	SDO	SL03	CH09	n/a	Node-1	?	2A	AC
TWV N1-3 Latch Cmd	Node-1 3-Way SDS Vlv-3 Latch Cmd	N1-1	A05	SDO	SL03	CH10	n/a	Node-1	?	2A	AC
TWV N1-4 Solenoid Cmd	Node-1 3-Way SDS Vlv-4 Solenoid Cmd	N1-1	A05	SDO	SL03	CH11	n/a	Node-1	?	2A	AC
TWV N1-4 Latch Cmd	Node-1 3-Way SDS Vlv-4 Latch Cmd	N1-1	A05	SDO	SL03	CH12	n/a	Node-1	?	2A	AC
SPARE	SPARE	N1-1	A05	SDO	SL03	CH13	n/a	SPARE	SPARE		
SPARE	SPARE	N1-1	A05	SDO	SL03	CH14	n/a	SPARE	SPARE		
SPARE	SPARE	N1-1	A05	SDO	SL03	CH15	n/a	SPARE	SPARE		
SPARE	SPARE	N1-1	A05	SDO	SL03	CH16	n/a	SPARE	SPARE		
SPARE	SPARE	N1-1	A10	DIO	SL04	CH00	SPARE	SPARE	SPARE		
SPARE	SPARE	N1-1	A10	DIO	SL04	CH01	SPARE	SPARE	SPARE		
SPARE	SPARE	N1-1	A10	DIO	SL04	CH02	SPARE	SPARE	SPARE		
SPARE	SPARE	N1-1	A10	DIO	SL04	CH03	SPARE	SPARE	SPARE		
SPARE	SPARE	N1-1	A10	DIO	SL04	CH04	SPARE	SPARE	SPARE		
SPARE	SPARE	N1-1	A10	DIO	SL04	CH05	SPARE	SPARE	SPARE		
SPARE	SPARE	N1-1	A10	DIO	SL04	CH06	SPARE	SPARE	SPARE		
SPARE	SPARE	N1-1	A10	DIO	SL04	CH07	SPARE	SPARE	SPARE		
SPARE	SPARE	N1-1	A10	DIO	SL04	CH08	SPARE	SPARE	SPARE		
SPARE	SPARE	N1-1	A10	DIO	SL04	CH09	SPARE	SPARE	SPARE		
SPARE	SPARE	N1-1	A10	DIO	SL04	CH10	SPARE	SPARE	SPARE		
SPARE	SPARE	N1-1	A10	DIO	SL04	CH11	SPARE	SPARE	SPARE		
SPARE	SPARE	N1-1	A10	DIO	SL04	CH12	SPARE	SPARE	SPARE		
SPARE	SPARE	N1-1	A10	DIO	SL04	CH13	SPARE	SPARE	SPARE		
SPARE	SPARE	N1-1	A10	DIO	SL04	CH14	SPARE	SPARE	SPARE		
SPARE	SPARE	N1-1	A10	DIO	SL04	CH15	SPARE	SPARE	SPARE		
Psiv APAS PMA2 Cap Plngr L-1 Pos	PMA-2 Passive APAS Capture Plunger Long-1 Pos	N1-1	A10	DIO	SL04	CH16	A	PMA-2	OSO	2A	5A
Psiv APAS PMA2 Cap Plngr S-1 Pos	PMA-2 Passive APAS Capture Plunger Short-1 Pos	N1-1	A10	DIO	SL04	CH17	A	PMA-2	OSO	2A	5A
Psiv APAS PMA2 Dep Plngr-1 Pos	PMA-2 Passive APAS Departure Plunger-1	N1-1	A10	DIO	SL04	CH18	B	PMA-2	OSO	2A	5A
Psiv APAS PMA2 Intf Sealed-1 Pos	PMA-2 Passive APAS Interface Sealed-1 Pos	N1-1	A10	DIO	SL04	CH19	B	PMA-2	OSO	2A	5A
SPARE	SPARE	N1-1	A10	DIO	SL04	CH20	SPARE	SPARE	SPARE		
GNC Moding Ind PMA2 Active ACS Ind Cmd-1	PMA-2 Talkback Panel Active ACS Ind Cmd-1	N1-1	A10	DIO	SL04	CH21	A	PMA-2	MCS	2A	5A
GNC Moding Ind PMA2 Free Drift Ind Cmd-1	PMA-2 Talkback Panel Free Drift Ind Cmd-1	N1-1	A10	DIO	SL04	CH22	A	PMA-2	MCS	2A	5A

### N1-1 MDM Channel Assignments

Name	Description	MDM	Card Refdes	Card Type	Slot No.	Chanl No.	Chanl Type	ISS Element	OPS Position	Flight Activation	Flight Deactivation
Psiv APAS PMA3 Cap Plngr L-1 Pos	PMA-3 Passive APAS Capture Plunger Long-1 Pos	N1-1	A10	DIO	SL04	CH23	A	PMA-3	OSO	3A	16A
Psiv APAS PMA3 Cap Plngr S-1 Pos	PMA-3 Passive APAS Capture Plunger Short-1 Pos	N1-1	A10	DIO	SL04	CH24	A	PMA-3	OSO	3A	16A
Psiv APAS PMA3 Dep Plngr-1 Pos	PMA-3 Passive APAS Departure Plunger-1 Pos	N1-1	A10	DIO	SL04	CH25	A	PMA-3	OSO	3A	16A
Psiv APAS PMA3 Intf Sealed-1 Pos	PMA-3 Passive APAS Interface Sealed-1 Pos	N1-1	A10	DIO	SL04	CH26	B	PMA-3	OSO	3A	16A
SPARE	SPARE	N1-1	A10	DIO	SL04	CH27	SPARE				
SPARE	SPARE	N1-1	A10	DIO	SL04	CH28	SPARE				
GNC Moding Ind PMA3 Active ACS Ind Cmd-1	PMA-3 Talkback Panel Active ACS Ind Cmd-1	N1-1	A10	DIO	SL04	CH29	A	PMA-3	MCS	2A	5A
GNC Moding Ind PMA3 Free Drift Ind Cmd-1	PMA-3 Talkback Panel Free Drift Ind Cmd-1	N1-1	A10	DIO	SL04	CH30	A	PMA-3	MCS	2A	5A
SPARE	SPARE	N1-1	A10	DIO	SL04	CH31	SPARE				
VAV Cont N1-N1 Exc	Node-1 Air Mix Rheostat Exc	N1-1	A04	LLA	SL05	CH00	A	Node-1	ECLSS	2A	AC
VAV Cont N1-N1 Pos	Node-1 Air Mix Rheostat Pos	N1-1	A04	LLA	SL05	CH01	B	Node-1	ECLSS	2A	AC
Smk Det N1-1 Scatter Meas	Node-1 Smk Det-1 Scatter Meas	N1-1	A04	LLA	SL05	CH02	B	Node-1	ECLSS	2A	AC
Smk Det N1-1 Obscuration Meas	Node-1 Smk Det-1 Obscuration Meas	N1-1	A04	LLA	SL05	CH03	A	Node-1	ECLSS	2A	AC
SPARE	SPARE	N1-1	A04	LLA	SL05	CH04	SPARE	SPARE	SPARE		
SPARE	SPARE	N1-1	A04	LLA	SL05	CH05	SPARE	SPARE	SPARE		
SPARE	SPARE	N1-1	A04	LLA	SL05	CH06	SPARE	SPARE	SPARE		
SPARE	SPARE	N1-1	A04	LLA	SL05	CH07	SPARE	SPARE	SPARE		
SPARE	SPARE	N1-1	A04	LLA	SL05	CH08	SPARE	SPARE	SPARE		
SPARE	SPARE	N1-1	A04	LLA	SL05	CH09	SPARE	SPARE	SPARE		
SPARE	SPARE	N1-1	A04	LLA	SL05	CH10	SPARE	SPARE	SPARE		
SPARE	SPARE	N1-1	A04	LLA	SL05	CH11	SPARE	SPARE	SPARE		
SPARE	SPARE	N1-1	A04	LLA	SL05	CH12	SPARE	SPARE	SPARE		
SPARE	SPARE	N1-1	A04	LLA	SL05	CH13	SPARE	SPARE	SPARE		
SPARE	SPARE	N1-1	A04	LLA	SL05	CH14	SPARE	SPARE	SPARE		
SPARE	SPARE	N1-1	A04	LLA	SL05	CH15	SPARE	SPARE	SPARE		
SPARE	SPARE	N1-1	A04	LLA	SL05	CH16	SPARE	SPARE	SPARE		
SPARE	SPARE	N1-1	A04	LLA	SL05	CH17	SPARE	SPARE	SPARE		
SPARE	SPARE	N1-1	A04	LLA	SL05	CH18	SPARE	SPARE	SPARE		
SPARE	SPARE	N1-1	A04	LLA	SL05	CH19	SPARE	SPARE	SPARE		
SPARE	SPARE	N1-1	A04	LLA	SL05	CH20	SPARE	SPARE	SPARE		
SPARE	SPARE	N1-1	A04	LLA	SL05	CH21	SPARE	SPARE	SPARE		
SPARE	SPARE	N1-1	A04	LLA	SL05	CH22	SPARE	SPARE	SPARE		
SPARE	SPARE	N1-1	A04	LLA	SL05	CH23	SPARE	SPARE	SPARE		
SPARE	SPARE	N1-1	A04	LLA	SL05	CH24	SPARE	SPARE	SPARE		

### N1-1 MDM Channel Assignments

Name	Description	MDM	Card Refdes	Card Type	Slot No.	Chanl No.	Chanl Type	ISS Element	OPS Position	Flight Activation	Flight Deactivation
SPARE	SPARE	N1-1	A04	LLA	SL05	CH25	SPARE	SPARE	SPARE		
SPARE	SPARE	N1-1	A04	LLA	SL05	CH26	SPARE	SPARE	SPARE		
SPARE	SPARE	N1-1	A04	LLA	SL05	CH27	SPARE	SPARE	SPARE		
SPARE	SPARE	N1-1	A04	LLA	SL05	CH28	SPARE	SPARE	SPARE		
SPARE	SPARE	N1-1	A04	LLA	SL05	CH29	SPARE	SPARE	SPARE		
SPARE	SPARE	N1-1	A04	LLA	SL05	CH30	SPARE	SPARE	SPARE		
SPARE	SPARE	N1-1	A04	LLA	SL05	CH31	SPARE	SPARE	SPARE		
SPARE	SPARE	N1-1	All	AIO	SL06	CH00	SPARE	SPARE	SPARE		
SPARE	SPARE	N1-1	All	AIO	SL06	CH01	SPARE	SPARE	SPARE		
VAV Dmpr N1-N1 Pos Cmd	Node-1 Air Mix Vlv Pos Cmd	N1-1	All	AIO	SL06	CH02	B	Node-1	ECLSS	2A	AC
Cab Vent Fan N1 Speed Cmd	Node-1 Cabin Fan Speed Cmd	N1-1	All	AIO	SL06	CH03	A	Node-1	ECLSS	2A	AC
IMV V N1-Aft Rtn Speed Cmd	Node-1 Aft Rtn IMV Vlv Speed Cmd	N1-1	All	AIO	SL06	CH04	B	Node-1	ECLSS	2A	AC
IMV V N1-Aft Sply Speed Cmd	Node-1 Aft Sply IMV Vlv Speed Cmd	N1-1	All	AIO	SL06	CH05	A	Node-1	ECLSS	2A	AC
IMV V N1-Port Sply Speed Cmd	Node-1 Port Sply IMV Vlv Speed Cmd	N1-1	All	AIO	SL06	CH06	A	Node-1	ECLSS	2A	AC
IMV V N1-Stbd Rtn Speed Cmd	Node-1 Stbd Rtn IMV Vlv Speed Cmd	N1-1	All	AIO	SL06	CH07	B	Node-1	ECLSS	2A	AC
IMV V N1-Stbd Sply Speed Cmd	Node-1 Stbd Sply IMV Vlv Speed Cmd	N1-1	All	AIO	SL06	CH08	B	Node-1	ECLSS	2A	AC
SPARE	SPARE	N1-1	All	AIO	SL06	CH09	SPARE	SPARE	SPARE		
SPARE	SPARE	N1-1	All	AIO	SL06	CH10	SPARE	SPARE	SPARE		
SPARE	SPARE	N1-1	All	AIO	SL06	CH11	SPARE	SPARE	SPARE		
SPARE	SPARE	N1-1	All	AIO	SL06	CH12	SPARE	SPARE	SPARE		
SPARE	SPARE	N1-1	All	AIO	SL06	CH13	SPARE	SPARE	SPARE		
SPARE	SPARE	N1-1	All	AIO	SL06	CH14	SPARE	SPARE	SPARE		
SPARE	SPARE	N1-1	All	AIO	SL06	CH15	SPARE	SPARE	SPARE		
SPARE	SPARE	N1-1	All	AIO	SL06	CH16	SPARE	SPARE	SPARE		
HX Lab LT-A Out RTD Meas	Lab LT-A HX Outlet RTD Meas	N1-1	A03	LLA	SL07	CH00	A	Lab	TCS	5A	12A
Pri Struct N1 RTD Zone 1-1 Meas	Node-1 Shell Zone-1 RTD-1 Meas	N1-1	A03	LLA	SL07	CH01	B	Node-1	TCS	2A	AC
Pri Struct N1 RTD Zone 1-3 Meas	Node-1 Shell Zone-1 RTD-3 Meas	N1-1	A03	LLA	SL07	CH02	B	Node-1	TCS	2A	AC
Pri Struct N1 RTD Zone 2-1 Meas	Node-1 Shell Zone-2 RTD-1 Meas	N1-1	A03	LLA	SL07	CH03	A	Node-1	TCS	2A	AC
Pri Struct N1 RTD Zone 3-1 Meas	Node-1 Shell Zone-3 RTD-1 Meas	N1-1	A03	LLA	SL07	CH04	B	Node-1	TCS	2A	AC
Pri Struct N1 RTD Zone 3-3 Meas	Node-1 Shell Zone-3 RTD-3 Meas	N1-1	A03	LLA	SL07	CH05	A	Node-1	TCS	2A	AC
Pri Struct N1 RTD Zone 4-1 Meas	Node-1 Shell Zone-4 RTD-1 Meas	N1-1	A03	LLA	SL07	CH06	A	Node-1	TCS	2A	AC
Pri Struct N1 RTD Zone 5-1 Meas	Node-1 Shell Zone-5 RTD-1 Meas	N1-1	A03	LLA	SL07	CH07	B	Node-1	TCS	2A	AC
Pri Struct N1 RTD Zone 5-3 Meas	Node-1 Shell Zone-5 RTD-3 Meas	N1-1	A03	LLA	SL07	CH08	B	Node-1	TCS	2A	AC
Pri Struct N1 RTD Zone 6-1 Meas	Node-1 Shell Zone-6 RTD-1 Meas	N1-1	A03	LLA	SL07	CH09	A	Node-1	TCS	2A	AC
Pri Struct N1 RTD Zone 6-3 Meas	Node-1 Shell Zone-6 RTD-3 Meas	N1-1	A03	LLA	SL07	CH10	A	Node-1	TCS	2A	AC
Pri Struct N1 RTD Zone 7-1 Meas	Node-1 Shell Zone-7 RTD-1 Meas	N1-1	A03	LLA	SL07	CH11	B	Node-1	TCS	2A	AC
Pri Struct N1 RTD Zone 7-3 Meas	Node-1 Shell Zone-7 RTD-3 Meas	N1-1	A03	LLA	SL07	CH12	A	Node-1	TCS	2A	AC
Pri Struct N1 RTD Zone 8-1 Meas	Node-1 Shell Zone-8 RTD-1 Meas	N1-1	A03	LLA	SL07	CH13	B	Node-1	TCS	2A	AC

### N1-1 MDM Channel Assignments

Name	Description	MDM	Card Refdes	Card Type	Slot No.	Chanl No.	Chanl Type	ISS Element	OPS Position	Flight Activation	Flight Deactivation
Pri Struct N1 RTD Zone 9-1 Meas	Node-1 Shell Zone-9 RTD-1 Meas	N1-1	A03	LLA	SL07	CH14	B	Node-1	TCS	2A	AC
SPARE	SPARE	N1-1	A03	LLA	SL07	CH15	SPARE	SPARE	SPARE		
SPARE	SPARE	N1-1	A03	LLA	SL07	CH16	SPARE	SPARE	SPARE		
SPARE	SPARE	N1-1	A03	LLA	SL07	CH17	SPARE	SPARE	SPARE		
Pri Struct N2 RTD Zone 1-1 Meas	Node-2 Shell Zone-1 RTD-1 Meas	N1-1	A03	LLA	SL07	CH18	A	Node-2	TCS	10A	10A
Pri Struct N2 RTD Zone 2-1 Meas	Node-2 Shell Zone-1 RTD-3 Meas	N1-1	A03	LLA	SL07	CH19	B	Node-2	TCS	10A	10A
Pri Struct N2 RTD Zone 9-1 Meas	Node-2 Shell Zone-2 RTD-1 Meas	N1-1	A03	LLA	SL07	CH20	A	Node-2	TCS	10A	10A
Pri Struct N2 RTD Zone 3-2 Meas	Node-2 Shell Zone-3 RTD-1 Meas	N1-1	A03	LLA	SL07	CH21	B	Node-2	TCS	10A	10A
Pri Struct N2 RTD Zone 5-1 Meas	Node-2 Shell Zone-3 RTD-3 Meas	N1-1	A03	LLA	SL07	CH22	B	Node-2	TCS	10A	10A
Pri Struct N2 RTD Zone 6-1 Meas	Node-2 Shell Zone-4 RTD-1 Meas	N1-1	A03	LLA	SL07	CH23	A	Node-2	TCS	10A	10A
Pri Struct N2 RTD Zone 7-1 Meas	Node-2 Shell Zone-5 RTD-1 Meas	N1-1	A03	LLA	SL07	CH24	A	Node-2	TCS	10A	10A
Pri Struct N2 RTD Zone 1-3 Meas	Node-2 Shell Zone-5 RTD-3 Meas	N1-1	A03	LLA	SL07	CH25	B	Node-2	TCS	10A	10A
Pri Struct N2 RTD Zone 2-2 Meas	Node-2 Shell Zone-6 RTD-1 Meas	N1-1	A03	LLA	SL07	CH26	B	Node-2	TCS	10A	10A
Pri Struct N2 RTD Zone 9-2 Meas	Node-2 Shell Zone-6 RTD-3 Meas	N1-1	A03	LLA	SL07	CH27	A	Node-2	TCS	10A	10A
Pri Struct N2 RTD Zone 3-4 Meas	Node-2 Shell Zone-7 RTD-1 Meas	N1-1	A03	LLA	SL07	CH28	B	Node-2	TCS	10A	10A
Pri Struct N2 RTD Zone 5-3 Meas	Node-2 Shell Zone-7 RTD-3 Meas	N1-1	A03	LLA	SL07	CH29	A	Node-2	TCS	10A	10A
Pri Struct N2 RTD Zone 6-3 Meas	Node-2 Shell Zone-8 RTD-1 Meas	N1-1	A03	LLA	SL07	CH30	A	Node-2	TCS	10A	10A
Pri Struct N2 RTD Zone 7-3 Meas	Node-2 Shell Zone-9 RTD-1 Meas	N1-1	A03	LLA	SL07	CH31	B	Node-2	TCS	10A	10A
VAV Dmpr N1-N1 Pos Fdbk	Node-1 Air Mix Vlv Pos Fdbk	N1-1	A12	HLA	SL08	CH00	A	Node-1	ECLSS	2A	AC
IMV Fan N1-Aft Rtn Speed Fdbk	Node-1 Aft IMV Fan Speed Fdbk	N1-1	A12	HLA	SL08	CH01	B	Node-1	ECLSS	2A	AC
Cab Vent Fan N1 Speed Fdbk	Node-1 Cabin Fan Speed Fdbk	N1-1	A12	HLA	SL08	CH02	B	Node-1	ECLSS	2A	AC
Cab Vent Fan N1 Diff Press Xdcr Meas	Node-1 Cabin Fan Diff Press Xdcr Meas	N1-1	A12	HLA	SL08	CH03	A	Node-1	ECLSS	2A	AC
SPARE	SPARE	N1-1	A12	HLA	SL08	CH04	SPARE	SPARE	SPARE		
SPARE	SPARE	N1-1	A12	HLA	SL08	CH05	SPARE	SPARE	SPARE		
SPARE	SPARE	N1-1	A12	HLA	SL08	CH06	SPARE	SPARE	SPARE		
SPARE	SPARE	N1-1	A12	HLA	SL08	CH07	SPARE	SPARE	SPARE		
SPARE	SPARE	N1-1	A12	HLA	SL08	CH08	SPARE	SPARE	SPARE		
SPARE	SPARE	N1-1	A12	HLA	SL08	CH09	SPARE	SPARE	SPARE		
SPARE	SPARE	N1-1	A12	HLA	SL08	CH10	SPARE	SPARE	SPARE		
SPARE	SPARE	N1-1	A12	HLA	SL08	CH11	SPARE	SPARE	SPARE		
SPARE	SPARE	N1-1	A12	HLA	SL08	CH12	SPARE	SPARE	SPARE		
SPARE	SPARE	N1-1	A12	HLA	SL08	CH13	SPARE	SPARE	SPARE		
SPARE	SPARE	N1-1	A12	HLA	SL08	CH14	SPARE	SPARE	SPARE		
SPARE	SPARE	N1-1	A12	HLA	SL08	CH15	SPARE	SPARE	SPARE		
SPARE	SPARE	N1-1	A12	HLA	SL08	CH16	SPARE	SPARE	SPARE		
SPARE	SPARE	N1-1	A12	HLA	SL08	CH17	SPARE	SPARE	SPARE		
SPARE	SPARE	N1-1	A12	HLA	SL08	CH18	SPARE	SPARE	SPARE		
SPARE	SPARE	N1-1	A12	HLA	SL08	CH19	SPARE	SPARE	SPARE		
SPARE	SPARE	N1-1	A12	HLA	SL08	CH20	SPARE	SPARE	SPARE		

### N1-1 MDM Channel Assignments

Name	Description	MDM	Card Refdes	Card Type	Slot No.	Chanl No.	Chanl Type	ISS Element	OPS Position	Flight Activation	Flight Deactivation
SPARE	SPARE	N1-1	A12	HLA	SL08	CH21	SPARE	SPARE	SPARE		
SPARE	SPARE	N1-1	A12	HLA	SL08	CH22	SPARE	SPARE	SPARE		
SPARE	SPARE	N1-1	A12	HLA	SL08	CH23	SPARE	SPARE	SPARE		
SPARE	SPARE	N1-1	A12	HLA	SL08	CH24	SPARE	SPARE	SPARE		
SPARE	SPARE	N1-1	A12	HLA	SL08	CH25	SPARE	SPARE	SPARE		
SPARE	SPARE	N1-1	A12	HLA	SL08	CH26	SPARE	SPARE	SPARE		
SPARE	SPARE	N1-1	A12	HLA	SL08	CH27	SPARE	SPARE	SPARE		
SPARE	SPARE	N1-1	A12	HLA	SL08	CH28	SPARE	SPARE	SPARE		
SPARE	SPARE	N1-1	A12	HLA	SL08	CH29	SPARE	SPARE	SPARE		
SPARE	SPARE	N1-1	A12	HLA	SL08	CH30	SPARE	SPARE	SPARE		
SPARE	SPARE	N1-1	A12	HLA	SL08	CH31	SPARE	SPARE	SPARE		
SSMDM N1-2 RTD Meas	MDM PMA1-2 RTD Meas	N1-1	A02	LLA	SL09	CH00	A	PMA-2	TCS	2A	AC
Press Shl PMA1 RTD-1 Meas	PMA-1 Shell RTD-1 Meas	N1-1	A02	LLA	SL09	CH01	B	PMA-1	TCS	2A	AC
Press Shl PMA1 RTD-2 Meas	PMA-1 Shell RTD-2 Meas	N1-1	A02	LLA	SL09	CH02	B	PMA-1	TCS	2A	AC
Press Shl PMA1 RTD-3 Meas	PMA-1 Shell RTD-3 Meas	N1-1	A02	LLA	SL09	CH03	A	PMA-1	TCS	2A	AC
Press Shl PMA1 RTD 4 Meas	PMA-1 Shell RTD 4 Meas	N1-1	A02	LLA	SL09	CH04	B	PMA-1	TCS	2A	AC
Press Shl PMA1 RTD-5 Meas	PMA-1 Shell RTD-5 Meas	N1-1	A02	LLA	SL09	CH05	A	PMA-1	TCS	2A	AC
Psiv APAS PMA2 Htch RTD-1 Meas	PMA-2 APAS Hatch RTD-1 Meas	N1-1	A02	LLA	SL09	CH06	A	PMA-2	TCS	2A	5A
Psiv APAS PMA2 Htch RTD-2 Meas	PMA-2 APAS Hatch RTD-2 Meas	N1-1	A02	LLA	SL09	CH07	B	PMA-2	TCS	2A	5A
Psiv APAS PMA2 Htch RTD-3 Meas	PMA-2 APAS Hatch RTD-3 Meas	N1-1	A02	LLA	SL09	CH08	B	PMA-2	TCS	2A	5A
Psiv APAS PMA2 Htch RTD 4 Meas	PMA-2 APAS Hatch RTD 4 Meas	N1-1	A02	LLA	SL09	CH09	A	PMA-2	TCS	2A	5A
SPARE	SPARE	N1-1	A02	LLA	SL09	CH10	SPARE	SPARE	SPARE		
SPARE	SPARE	N1-1	A02	LLA	SL09	CH11	SPARE	SPARE	SPARE		
SPARE	SPARE	N1-1	A02	LLA	SL09	CH12	SPARE	SPARE	SPARE		
SPARE	SPARE	N1-1	A02	LLA	SL09	CH13	SPARE	SPARE	SPARE		
SPARE	SPARE	N1-1	A02	LLA	SL09	CH14	SPARE	SPARE	SPARE		
SPARE	SPARE	N1-1	A02	LLA	SL09	CH15	SPARE	SPARE	SPARE		
SPARE	SPARE	N1-1	A02	LLA	SL09	CH16	SPARE	SPARE	SPARE		
SPARE	SPARE	N1-1	A02	LLA	SL09	CH17	SPARE	SPARE	SPARE		
SPARE	SPARE	N1-1	A02	LLA	SL09	CH18	SPARE	SPARE	SPARE		
SPARE	SPARE	N1-1	A02	LLA	SL09	CH19	SPARE	SPARE	SPARE		
SPARE	SPARE	N1-1	A02	LLA	SL09	CH20	SPARE	SPARE	SPARE		
SPARE	SPARE	N1-1	A02	LLA	SL09	CH21	SPARE	SPARE	SPARE		
CMGEA-2 RTD-1 Meas	CMGEA-2 RTD-1 Meas	N1-1	A02	LLA	SL09	CH22	B	ITC-Z1	?	?	?
CMGEA-2 RTD-2 Meas	CMGEA-2 RTD-2 Meas	N1-1	A02	LLA	SL09	CH23	A	ITC-Z1	?	?	?
CMGEA-3 RTD-1 Meas	CMGEA-3 RTD-1 Meas	N1-1	A02	LLA	SL09	CH24	A	ITC-Z1	?	?	?
CMGEA-3 RTD-2 Meas	CMGEA-3 RTD-2 Meas	N1-1	A02	LLA	SL09	CH25	B	ITC-Z1	?	?	?
SPARE	SPARE	N1-1	A02	LLA	SL09	CH26	SPARE	SPARE	SPARE		
SPARE	SPARE	N1-1	A02	LLA	SL09	CH27	SPARE	SPARE	SPARE		

### N1-1 MDM Channel Assignments

Name	Description	MDM	Card Refdes	Card Type	Slot No.	Chanl No.	Chanl Type	ISS Element	OPS Position	Flight Activation	Flight Deactivation
SPDA Z1-3B Util Rail RTD-1 Meas	SPDA Z1-3B Util Rail RTD-1 Meas	N1-1	A02	LLA	SL09	CH28	B	ITC-Z1	TCS	3A	AC
SPARE	SPARE	N1-1	A02	LLA	SL09	CH29	SPARE	SPARE	SPARE		
SPARE	SPARE	N1-1	A02	LLA	SL09	CH30	SPARE	SPARE	SPARE		
SPDA Z1-4B Util Rail RTD-2 Meas	SPDA Z1-4B Util Rail RTD-2 Meas	N1-1	A02	LLA	SL09	CH31	B	ITC-Z1	TCS	3A	AC

## N1-2 MDM Channel Assignments

Name	Description	MDM	Card Refdes	Card Type	Slot No.	Chnl No.	Chnl Type	ISS Element	OPS Position	Flight Activation	Flight Deactivation
HX Lab MT-B IN1 V Norm Fl Pos	Lab MT-B HX Inlet Byp Vlv Norm Flow Pos Ind	N1-2	A09	DIO	SL02	CH00	A	LAB	TCS	5A	12A
HX Lab MT-B IN1 V Byp Fl Cmd	Lab MT-B HX Inlet Byp Vlv Byp Flow Pos Ind	N1-2	A09	DIO	SL02	CH01	A	LAB	TCS	5A	12A
HX Lab MT-B Out V Open Pos	Lab MT-B HX Outlet Isn/Rlf Vlv Open Pos Ind	N1-2	A09	DIO	SL02	CH02	B	LAB	TCS	5A	12A
HX Lab MT-B Out V Cls Pos	Lab MT-B HX Outlet Isn/Rlf Vlv Cls Pos Ind	N1-2	A09	DIO	SL02	CH03	B	LAB	TCS	5A	12A
Smk Det N2-1 Bit Enbl	Node-1 Smk Det-2 Bit Enbl	N1-2	A09	DIO	SL02	CH04	B	Node-1	TCS	2A	AC
VAV Dmpr N1-CU Enbl Cmd	Cupola Air Mix Vlv Enable Cmd	N1-2	A09	DIO	SL02	CH05	A	Node-1	ECLSS	2A	AC
IMV Fan N1-Port Sply On/Off Cmd	Node-1 Port IMV Fan On/Off Cmd	N1-2	A09	DIO	SL02	CH06	A	Node-1	ECLSS	2A	AC
IMV Fan N1-Stbd Rtn On/Off Cmd	Node-1 Stbd IMV Fan On/Off Cmd	N1-2	A09	DIO	SL02	CH07	A	Node-1	ECLSS	2A	AC
Spare	Spare	N1-2	A09	DIO	SL02	CH08	Spare	Spare	Spare		
Spare	Spare	N1-2	A09	DIO	SL02	CH09	Spare	Spare	Spare		
Spare	Spare	N1-2	A09	DIO	SL02	CH10	Spare	Spare	Spare		
Spare	Spare	N1-2	A09	DIO	SL02	CH11	Spare	Spare	Spare		
Spare	Spare	N1-2	A09	DIO	SL02	CH12	Spare	Spare	Spare		
Spare	Spare	N1-2	A09	DIO	SL02	CH13	Spare	Spare	Spare		
Spare	Spare	N1-2	A09	DIO	SL02	CH14	Spare	Spare	Spare		
Spare	Spare	N1-2	A09	DIO	SL02	CH15	Spare	Spare	Spare		
IMV V N1-Fwd Rtn Open Pos	Node-1 Fwd Rtn IMV Vlv Cls Pos	N1-2	A09	DIO	SL02	CH16	A	Node-1	ECLSS	2A	AC
IMV V N1-Fwd Rtn Enbl Cmd	Node-1 Fwd Rtn IMV Vlv Enbl Cmd	N1-2	A09	DIO	SL02	CH17	A	Node-1	ECLSS	2A	AC
IMV V N1-Fwd Rtn Cls Pos	Node-1 Fwd Rtn IMV Vlv Open Pos	N1-2	A09	DIO	SL02	CH18	B	Node-1	ECLSS	2A	AC
IMV V N1-Fwd Sply Open Pos	Node-1 Fwd Sply IMV Vlv Open Pos	N1-2	A09	DIO	SL02	CH19	B	Node-1	ECLSS	2A	AC
IMV V N1-Fwd Sply Cls Pos	Node-1 Fwd Sply IMV Vlv Cls Pos	N1-2	A09	DIO	SL02	CH20	B	Node-1	ECLSS	2A	AC
IMV V N1-Fwd Sply Enbl Cmd	Node-1 Fwd Sply IMV Vlv Enbl Cmd	N1-2	A09	DIO	SL02	CH21	A	Node-1	ECLSS	2A	AC
IMV V N1-Nad Rtn Open Pos	Node-1 Nad Rtn IMV Vlv Open Pos	N1-2	A09	DIO	SL02	CH22	A	Node-1	ECLSS	2A	AC
IMV V N1-Nad Rtn Cls Pos	Node-1 Nad Rtn IMV Vlv Cls Pos	N1-2	A09	DIO	SL02	CH23	A	Node-1	ECLSS	2A	AC
IMV V N1-Nad Rtn Enbl Cmd	Node-1 Nad Rtn IMV Vlv Enbl Cmd	N1-2	A09	DIO	SL02	CH24	A	Node-1	ECLSS	2A	AC
IMV V N1-Nad Sply Enbl Cmd	Node-1 Nad Sply IMV Vlv Enbl Cmd	N1-2	A09	DIO	SL02	CH25	A	Node-1	ECLSS	2A	AC
IMV V N1-Nad Sply Open Pos	Node-1 Nad Sply IMV Vlv Open Pos	N1-2	A09	DIO	SL02	CH26	B	Node-1	ECLSS	2A	AC
IMV V N1-Nad Sply Cls Pos	Node-1 Nad Sply IMV Vlv Cls Pos	N1-2	A09	DIO	SL02	CH27	B	Node-1	ECLSS	2A	AC
Spare	Spare	N1-2	A09	DIO	SL02	CH28	Spare	Spare	ECLSS		
Spare	Spare	N1-2	A09	DIO	SL02	CH29	Spare	Spare	Spare		
Spare	Spare	N1-2	A09	DIO	SL02	CH30	Spare	Spare	Spare		
Spare	Spare	N1-2	A09	DIO	SL02	CH31	Spare	Spare	Spare		
SSMDM N1-1 Htr Pwr	MDM PMA1-1 Htr Pwr	N1-2	A05	SDO	SL03	CH00	n/a	PMA-1	TCS	2A	AC
HX Lab MT-B IN1 V Norm Fl Cmd	Lab MT-B HX Inlet Byp Vlv Norm Flow Cmd	N1-2	A05	SDO	SL03	CH01	n/a	LAB	TCS	5A	12A
HX Lab MT-B IN1 V Byp Fl Cmd	Lab MT-B HX Inlet Byp Vlv Byp Flow Cmd	N1-2	A05	SDO	SL03	CH02	n/a	LAB	TCS	5A	12A
HX Lab MT-B Out V Open Cmd	Lab MT-B HX Outlet Isn/Rlf Vlv Open Cmd	N1-2	A05	SDO	SL03	CH03	n/a	LAB	TCS	5A	12A
HX Lab MT-B Out V Cls Cmd	Lab MT-B HX Outlet Isn/Rlf Vlv Cls Cmd	N1-2	A05	SDO	SL03	CH04	n/a	LAB	TCS	5A	12A
Rnd Win Htr-1 Enbl Cmd	Cupola Rnd Window Htr-1 Enbl Cmd	N1-2	A05	SDO	SL03	CH05	n/a	Cupola	TCS	10A	AC
Rnd Win Htr-2 Enbl Cmd	Cupola Rnd Window Htr-2 Enbl Cmd	N1-2	A05	SDO	SL03	CH06	n/a	Cupola	TCS	10A	AC

### N1-2 MDM Channel Assignments

Name	Description	MDM	Card Refdes	Card Type	Slot No.	Chanl No.	Chanl Type	ISS Element	OPS Position	Flight Activation	Flight Deactivation
Trap Win 1 Htr Enbl Cmd	Cupola Trap Window-1 Htr Enbl Cmd	N1-2	A05	SDO	SL03	CH07	n/a	Cupola	TCS	10A	AC
Trap Win 2 Htr Enbl Cmd	Cupola Trap Window-2 Htr Enbl Cmd	N1-2	A05	SDO	SL03	CH08	n/a	Cupola	TCS	10A	AC
Trap Win 3 Htr Enbl Cmd	Cupola Trap Window-3 Htr Enbl Cmd	N1-2	A05	SDO	SL03	CH09	n/a	Cupola	TCS	10A	AC
Trap Win 4 Htr Enbl Cmd	Cupola Trap Window-4 Htr Enbl Cmd	N1-2	A05	SDO	SL03	CH10	n/a	Cupola	TCS	10A	AC
Trap Win 5 RTD-1 Meas	Cupola Trap Window-5 Hrt Enbl Cmd	N1-2	A05	SDO	SL03	CH11	n/a	Cupola	TCS	10A	AC
Trap Win 6 RTD-1 Meas	Cupola Trap Window-6 Htr Enbl Cmd	N1-2	A05	SDO	SL03	CH12	n/a	Cupola	TCS	10A	AC
Spare	Spare	N1-2	A05	SDO	SL03	CH13	n/a	Spare	Spare		
Spare	Spare	N1-2	A05	SDO	SL03	CH14	n/a	Spare	Spare		
Spare	Spare	N1-2	A05	SDO	SL03	CH15	n/a	Spare	Spare		
Spare	Spare	N1-2	A05	SDO	SL03	CH16	n/a	Spare	Spare		
Spare	Spare	N1-2	A10	DIO	SL04	CH00	Spare	Spare	Spare		
Spare	Spare	N1-2	A10	DIO	SL04	CH01	Spare	Spare	Spare		
Spare	Spare	N1-2	A10	DIO	SL04	CH02	Spare	Spare	Spare		
Spare	Spare	N1-2	A10	DIO	SL04	CH03	Spare	Spare	Spare		
Spare	Spare	N1-2	A10	DIO	SL04	CH04	Spare	Spare	Spare		
Spare	Spare	N1-2	A10	DIO	SL04	CH05	Spare	Spare	Spare		
Spare	Spare	N1-2	A10	DIO	SL04	CH06	Spare	Spare	Spare		
Spare	Spare	N1-2	A10	DIO	SL04	CH07	Spare	Spare	Spare		
Spare	Spare	N1-2	A10	DIO	SL04	CH08	Spare	Spare	Spare		
Spare	Spare	N1-2	A10	DIO	SL04	CH09	Spare	Spare	Spare		
Spare	Spare	N1-2	A10	DIO	SL04	CH10	Spare	Spare	Spare		
Spare	Spare	N1-2	A10	DIO	SL04	CH11	Spare	Spare	Spare		
Spare	Spare	N1-2	A10	DIO	SL04	CH12	Spare	Spare	Spare		
Spare	Spare	N1-2	A10	DIO	SL04	CH13	Spare	Spare	Spare		
Spare	Spare	N1-2	A10	DIO	SL04	CH14	Spare	Spare	Spare		
Spare	Spare	N1-2	A10	DIO	SL04	CH15	Spare	Spare	Spare		
Psiv APAS PMA2 Cap Plngr L-2 Pos	PMA-2 Passive APAS Capture Plunger Long-2 Pos	N1-2	A10	DIO	SL04	CH16	A	PMA-2	OSO	2A	5A
Psiv APAS PMA2 Cap Plngr S-2 Pos	PMA-2 Passive APAS Capture Plunger Short-2 Pos	N1-2	A10	DIO	SL04	CH17	A	PMA-2	OSO	2A	5A
Psiv APAS PMA2 Dep Plngr-2 Pos	PMA-2 Passive APAS Departure Plngr-2 Pos	N1-2	A10	DIO	SL04	CH18	B	PMA-2	OSO	2A	5A
Psiv APAS PMA2 Intf Sealed-2 Pos	PMA-2 Passive APAS Interface Sealed-2 Pos	N1-2	A10	DIO	SL04	CH19	B	PMA-2	OSO	2A	5A
Spare	Spare			DIO	SL04	CH20	Spare	Spare	Spare		
GNC Moding Ind PMA2 Active ACS Ind Cmd-2	PMA-2 Talkback Panel Active ACS Ind Cmd-2	N1-2	A10	DIO	SL04	CH21	A	PMA-2	MCS	2A	5A
GNC Moding Ind PMA2 Free Drift Ind	PMA-2 Talkback Panel Free Drift Ind Cmd-2	N1-2	A10	DIO	SL04	CH22	A	PMA-2	MCS	2A	5A
Psiv APAS PMA3 Cap Plngr L-2 Pos	PMA-3 Passive APAS Capture Plngr Long-2 Pos	N1-2	A10	DIO	SL04	CH23	A	PMA-3	OSO	3A	16A

### N1-2 MDM Channel Assignments

Name	Description	MDM	Card Refdes	Card Type	Slot No.	Chnl No.	Chnl Type	ISS Element	OPS Position	Flight Activation	Flight Deactivation
Psiv APAS PMA3 Cap Plngr S-2 Pos	PMA-3 Passive APAS Capture Plngr Short-2 Pos	N1-2	A10	DIO	SL04	CH24	A	PMA-3	OSO	3A	16A
Psiv APAS PMA3 Dep Plngr-2 Pos	PMA-3 Passive APAS Departure Plngr-2 Pos	N1-2	A10	DIO	SL04	CH25	A	PMA-3	OSO	3A	16A
Psiv APAS PMA3 Intf Sealed-2 Pos	PMA-3 Passive APAS Interface Sealed-2 Pos	N1-2	A10	DIO	SL04	CH26	B	PMA-3	OSO	3A	16A
Spare	Spare	N1-2	A10	DIO	SL04	CH27	Spare	Spare	Spare		
Spare	Spare	N1-2	A10	DIO	SL04	CH28	Spare	Spare	Spare		
GNC Moding Ind PMA3 Active ACS Ind Cmd-2	PMA3 Talkback Panel Active ACS Ind Cmd-2	N1-2	A10	DIO	SL04	CH29	A	PMA-3	MCS	3A	16A
GNC Moding Ind PMA3 Free Drift Ind Cmd-2	PMA-3 Talkback Panel Free Drift Ind Cmd-2	N1-2	A10	DIO	SL04	CH30	A	PMA-3	MCS	3A	16A
Spare	Spare	N1-2	A10	DIO	SL04	CH31	Spare	Spare	Spare		
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VAV Cont CU-CU Pos	CUPOLA Air Mix Rheostat Pos	N1-2	A04	LLA	SL05	CH00	A	Cupola	ECLSS	2A	AC
VAV Cont CU-CU Exc	CUPOLA Air Mix Rheostat Exc	N1-2	A04	LLA	SL05	CH01	B	Cupola	ECLSS	2A	AC
Smk Det N2-1 Scatter Meas	Node-1 Smk Det-2 Scatter Meas	N1-2	A04	LLA	SL05	CH02	B	Node-1	ECLSS	2A	AC
Smk Det N2-1 Obscuration Meas	Node-1 Smk Det-2 Obscuration Meas	N1-2	A04	LLA	SL05	CH03	A	Node-1	ECLSS	2A	AC
Rnd Win RTD-1 Meas	Cupola Rnd Window RTD-1A Meas	N1-2	A04	LLA	SL05	CH04	B	Cupola	TCS	10A	AC
Rnd Win RTD-3 Meas	Cupola Rnd Window RTD-2A Meas	N1-2	A04	LLA	SL05	CH05	A	Cupola	TCS	10A	AC
Trap Win 1 RTD-1 Meas	Cupola Trap Window-1 RTD-1 Meas	N1-2	A04	LLA	SL05	CH06	A	Cupola	TCS	10A	AC
Trap Win 1 RTD-3 Meas	Cupola Trap Window-1 RTD-3 Meas	N1-2	A04	LLA	SL05	CH07	B	Cupola	TCS	10A	AC
Trap Win 2 RTD-1 Meas	Cupola Trap Window-2 RTD-1 Meas	N1-2	A04	LLA	SL05	CH08	B	Cupola	TCS	10A	AC
Trap Win 2 RTD-3 Meas	Cupola Trap Window-2 RTD-3 Meas	N1-2	A04	LLA	SL05	CH09	A	Cupola	TCS	10A	AC
Trap Win 3 RTD-1 Meas	Cupola Trap Window-3 RTD-1 Meas	N1-2	A04	LLA	SL05	CH10	A	Cupola	TCS	10A	AC
Trap Win 3 RTD-3 Meas	Cupola Trap Window-3 RTD-3 Meas	N1-2	A04	LLA	SL05	CH11	B	Cupola	TCS	10A	AC
Trap Win 4 RTD-1 Meas	Cupola Trap Window 4 RTD-1 Meas	N1-2	A04	LLA	SL05	CH12	A	Cupola	TCS	10A	AC
Trap Win 4 RTD-3 Meas	Cupola Trap Window-4 RTD-3 Meas	N1-2	A04	LLA	SL05	CH13	B	Cupola	TCS	10A	AC
Trap Win 5 Htr Enbl Cmd	Cupola Trap Window-5 RTD-1 Meas	N1-2	A04	LLA	SL05	CH14	B	Cupola	TCS	10A	AC
Trap Win 5 RTD-3 Meas	Cupola Trap Window-5 RTD-3 Meas	N1-2	A04	LLA	SL05	CH15	A	Cupola	TCS	10A	AC
Trap Win 6 Htr Enbl Cmd	Cupola Trap Window-6 RTD-1 Meas	N1-2	A04	LLA	SL05	CH16	B	Cupola	TCS	10A	AC
Trap Win 6 RTD-3 Meas	Cupola Trap Window-6 RTD-3 Meas	N1-2	A04	LLA	SL05	CH17	A	Cupola	TCS	10A	AC
Rnd Win RTD-2 Meas	Cupola Rnd Window RTD-1B Meas	N1-2	A04	LLA	SL05	CH18	A	Cupola	TCS	10A	AC
Rnd Win RTD-4 Meas	Cupola Rnd Window RTD-2B Meas	N1-2	A04	LLA	SL05	CH19	B	Cupola	TCS	10A	AC
Trap Win 1 RTD-2 Meas	Cupola Trap Window-1 RTD-2 Meas	N1-2	A04	LLA	SL05	CH20	A	Cupola	TCS	10A	AC
Trap Win 1 RTD 4 Meas	Cupola Trap Window-1 RTD-4 Meas	N1-2	A04	LLA	SL05	CH21	B	Cupola	TCS	10A	AC
Trap Win 2 RTD-2 Meas	Cupola Trap Window-2 RTD-2 Meas	N1-2	A04	LLA	SL05	CH22	B	Cupola	TCS	10A	AC
Trap Win 2 RTD 4 Meas	Cupola Trap Window-2 RTD-4 Meas	N1-2	A04	LLA	SL05	CH23	A	Cupola	TCS	10A	AC
Trap Win 3 RTD-2 Meas	Cupola Trap Window-3 RTD-2 Meas	N1-2	A04	LLA	SL05	CH24	A	Cupola	TCS	10A	AC
Trap Win 3 RTD-4 Meas	Cupola Trap Window-3 RTD-4 Meas	N1-2	A04	LLA	SL05	CH25	B	Cupola	TCS	10A	AC
Trap Win 4 RTD-2 Meas	Cupola Trap Window-4 RTD-2 Meas	N1-2	A04	LLA	SL05	CH26	B	Cupola	TCS	10A	AC
Trap Win 4 RTD 4 Meas	Cupola Trap Window 4 RTD-4 Meas	N1-2	A04	LLA	SL05	CH27	A	Cupola	TCS	10A	AC

### N1-2 MDM Channel Assignments

Name	Description	MDM	Card Refdes	Card Type	Slot No.	Chnl No.	Chnl Type	ISS Element	OPS Position	Flight Activation	Flight Deactivation
Trap Win 5 RTD-2 Meas	Cupola Trap Window-5 RTD-2 Meas	N1-2	A04	LLA	SL05	CH28	B	Cupola	TCS	10A	AC
Trap Win 5 RTD-4 Meas	Cupola Trap Window-5 RTD-4 Meas	N1-2	A04	LLA	SL05	CH29	A	Cupola	TCS	10A	AC
Trap Win 6 RTD-2 Meas	Cupola Trap Window-6 RTD-2 Meas	N1-2	A04	LLA	SL05	CH30	A	Cupola	TCS	10A	AC
Trap Win 6 RTD-4 Meas	Cupola Trap Window-6 RTD-4 Meas	N1-2	A04	LLA	SL05	CH31	B	Cupola	TCS	10A	AC
Spare	Spare	N1-2	A11	AIO	SL06	CH00	Spare	Spare	Spare		
Spare	Spare	N1-2	A11	AIO	SL06	CH01	Spare	Spare	Spare		
VAV Dmpr N1-CU Pos Cmd	Cupola Air Mix Vlv Pos Cmd	N1-2	A11	AIO	SL06	CH02	B	LS	TCS	2A	AC
Spare	Spare	N1-2	A11	AIO	SL06	CH03	Spare	Spare	Spare		
IMV V N1-Fwd Rtn Speed Cmd	Node-1 Fwd Rtn IMV Vlv Speed Cmd	N1-2	A11	AIO	SL06	CH04	B	Node-1	ECLSS	2A	AC
IMV V N1-Fwd Sply Speed Cmd	Node-1 Fwd Sply IMV Vlv Speed Cmd	N1-2	A11	AIO	SL06	CH05	A	Node-1	ECLSS	2A	AC
IMV V N1-Nad Rtn Speed Cmd	Node-1 Nad Rtn IMV Vlv Speed Cmd	N1-2	A11	AIO	SL06	CH06	A	Node-1	ECLSS	2A	AC
IMV V N1-Nad Sply Speed Cmd	Node-1 Nad Sply IMV Vlv Speed Cmd	N1-2	A11	AIO	SL06	CH07	B	Node-1	ECLSS	2A	AC
Spare	Spare	N1-2	A11	AIO	SL06	CH08	Spare	Spare	Spare		
Spare	Spare	N1-2	A11	AIO	SL06	CH09	Spare	Spare	Spare		
Spare	Spare	N1-2	A11	AIO	SL06	CH10	Spare	Spare	Spare		
Spare	Spare	N1-2	A11	AIO	SL06	CH11	Spare	Spare	Spare		
Spare	Spare	N1-2	A11	AIO	SL06	CH12	Spare	Spare	Spare		
Spare	Spare	N1-2	A11	AIO	SL06	CH13	Spare	Spare	Spare		
Spare	Spare	N1-2	A11	AIO	SL06	CH14	Spare	Spare	Spare		
Spare	Spare	N1-2	A11	AIO	SL06	CH15	Spare	Spare	Spare		
Spare	Spare	N1-2	A11	AIO	SL06	CH16	Spare	Spare	Spare		
HX Lab MT-B Out Rtd Meas	Lab MT-B HX Outlet RTD Meas	N1-2	A03	LLA	SL07	CH00	A	LAB	TCS		
Pn Struct N1 RTD Zone 1-2 Meas	Node-1 Shell Zone-1 RTD-2 Meas	N1-2	A03	LLA	SL07	CH01	B	Node-1	TCS	2A	AC
Pri Struct N1 RTD Zone 1-4 Meas	Node-1 Shell Zone-1 RTD-4 Meas	N1-2	A03	LLA	SL07	CH02	B	Node-1	TCS	2A	AC
Pri Struct N1 RTD Zone 2-2 Meas	Node-1 Shell Zone-2 RTD-2 Meas	N1-2	A03	LLA	SL07	CH03	A	Node-1	TCS	2A	AC
Pri Struct N1 RTD Zone 3-2 Meas	Node-1 Shell Zone-3 RTD-2 Meas	N1-2	A03	LLA	SL07	CH04	B	Node-1	TCS	2A	AC
Pri Struct N1 RTD Zone 3-4 Meas	Node-1 Shell Zone-3 RTD-4 Meas	N1-2	A03	LLA	SL07	CH05	A	Node-1	TCS	2A	AC
Pri Struct N1 RTD Zone 4-2 Meas	Node-1 Shell Zone 4 RTD-2 Meas	N1-2	A03	LLA	SL07	CH06	A	Node-1	TCS	2A	AC
Pri Struct N1 RTD Zone 5-2 Meas	Node-1 Shell Zone-5 RTD-2 Meas	N1-2	A03	LLA	SL07	CH07	B	Node-1	TCS	2A	AC
Pri Struct N1 RTD Zone 5-4 Meas	Node-1 Shell Zone-5 RTD-4 Meas	N1-2	A03	LLA	SL07	CH08	B	Node-1	TCS	2A	AC
Pri Struct N1 RTD Zone 6-2 Meas	Node-1 Shell Zone-6 RTD-2 Meas	N1-2	A03	LLA	SL07	CH09	A	Node-1	TCS	2A	AC
Pri Struct N1 RTD Zone 6-4 Meas	Node-1 Shell Zone-6 RTD-4 Meas	N1-2	A03	LLA	SL07	CH10	A	Node-1	TCS	2A	AC
Pri Struct N1 RTD Zone 7-2 Meas	Node-1 Shell Zone-7 RTD-2 Meas	N1-2	A03	LLA	SL07	CH11	B	Node-1	TCS	2A	AC
Pri Struct N1 RTD Zone 7-4 Meas	Node-1 Shell Zone-7 RTD-4 Meas	N1-2	A03	LLA	SL07	CH12	A	Node-1	TCS	2A	AC
Pri Struct N1 RTD Zone 8-2 Meas	Node-1 Shell Zone-8 RTD-2 Meas	N1-2	A03	LLA	SL07	CH13	B	Node-1	TCS	2A	AC
Pri Struct N1 RTD Zone 9-2 Meas	Node-1 Shell Zone-9 RTD-2 Meas	N1-2	A03	LLA	SL07	CH14	B	Node-1	TCS	2A	AC
Spare	Spare	N1-2	A03	LLA	SL07	CH15	Spare	Spare	Spare		
Spare	Spare	N1-2	A03	LLA	SL07	CH16	Spare	Spare	Spare		

### N1-2 MDM Channel Assignments

Name	Description	MDM	Card Refdes	Card Type	Slot No.	Chnl No.	Chnl Type	ISS Element	OPS Position	Flight Activation	Flight Deactivation
Spare	Spare	N1-2	A03	LLA	SL07	CH17	Spare	Spare	Spare		
Pri Struct N2 RTD Zone 1-2 Meas	Node-2 Shell Zone-1 RTD-2 Meas	N1-2	A03	LLA	SL07	CH18	A	Node-2	TCS	10A	10A
Pri Struct N2 RTD Zone 8-1 Meas	Node-2 Shell Zone-1 RTD-4 Meas	N1-2	A03	LLA	SL07	CH19	B	Node-2	TCS	10A	10A
Pri Struct N2 RTD Zone 3-1 Meas	Node-2 Shell Zone-2 RTD-2 Meas	N1-2	A03	LLA	SL07	CH20	A	Node-2	TCS	10A	10A
Pri Struct N2 RTD Zone 4-1 Meas	Node-2 Shell Zone-3 RTD-2 Meas	N1-2	A03	LLA	SL07	CH21	B	Node-2	TCS	10A	10A
Pri Struct N2 RTD Zone 5-2 Meas	Node-2 Shell Zone-3 RTD-4 Meas	N1-2	A03	LLA	SL07	CH22	B	Node-2	TCS	10A	10A
Pri Struct N2 RTD Zone 6-2 Meas	Node-2 Shell Zone 4 RTD-2 Meas	N1-2	A03	LLA	SL07	CH23	A	Node-2	TCS	10A	10A
Pri Struct N2 RTD Zone 7-2 Meas	Node-2 Shell Zone-5 RTD-2 Meas	N1-2	A03	LLA	SL07	CH24	A	Node-2	TCS	10A	10A
Pri Struct N2 RTD Zone 1-4 Meas	Node-2 Shell Zone-5 RTD-4 Meas	N1-2	A03	LLA	SL07	CH25	B	Node-2	TCS	10A	10A
Prl Struct N2 RTD Zone 8-2 Meas	Node-2 Shell Zone-6 RTD-2 Meas	N1-2	A03	LLA	SL07	CH26	B	Node-2	TCS	10A	10A
Pri Struct N2 RTD Zone 3-3 Meas	Node-2 Shell Zone-6 RTD-4 Meas	N1-2	A03	LLA	SL07	CH27	A	Node-2	TCS	10A	10A
Pri Struct N2 RTD Zone 4-2 Meas	Node-2 Shell Zone-7 RTD-2 Meas	N1-2	A03	LLA	SL07	CH28	B	Node-2	TCS	10A	10A
Pri Struct N2 RTD Zone 5-4 Meas	Node-2 Shell Zone-7 RTD-4 Meas	N1-2	A03	LLA	SL07	CH29	A	Node-2	TCS	10A	10A
Pn Struct N2 RTD Zone 6-4 Meas	Node-2 Shell Zone-8 RTD-2 Meas	N1-2	A03	LLA	SL07	CH30	A	Node-2	TCS	10A	10A
Pn Struct N2 RTD Zone 7-4 Meas	Node-2 Shell Zone-9 RTD-2 Meas	N1-2	A03	LLA	SL07	CH31	B	Node-2	TCS	10A	10A
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VAV Dmpr N1-CU Pos Fdbk	Cupola Air Mix Vlv Pos Fdbk	N1-2	A12	HLA	SL08	CH00	A	LS	ECLSS	2A	AC
IMV Fan N1-Port Sply Speed Cmd	Node-1 Port IMV Fan Speed Fdbk	N1-2	A12	HLA	SL08	CH01	B	Node-1	ECLSS	2A	AC
IMV Fan N1-Stbd Rtn Speed Cmd	Node-1 Stbd IMV Fan Speed Fdbk	N1-2	A12	HLA	SL08	CH02	B	Node-1	ECLSS	2A	AC
Abs Press Xdcr N1 Meas	Node-1 Cabin Press Xdcr Meas	N1-2	A12	HLA	SL08	CH03	A	Node-1	ECLSS	2A	AC
Spare	Spare	N1-2	A12	HLA	SL08	CH04	Spare	Spare	Spare		
Spare	Spare	N1-2	A12	HLA	SL08	CH05	Spare	Spare	Spare		
Spare	Spare	N1-2	A12	HLA	SL08	CH06	Spare	Spare	Spare		
Spare	Spare	N1-2	A12	HLA	SL08	CH07	Spare	Spare	Spare		
Spare	Spare	N1-2	A12	HLA	SL08	CH08	Spare	Spare	Spare		
Spare	Spare	N1-2	A12	HLA	SL08	CH09	Spare	Spare	Spare		
Spare	Spare	N1-2	A12	HLA	SL08	CH10	Spare	Spare	Spare		
Spare	Spare	N1-2	A12	HLA	SL08	CH11	Spare	Spare	Spare		
Spare	Spare	N1-2	A12	HLA	SL08	CH12	Spare	Spare	Spare		
Spare	Spare	N1-2	A12	HLA	SL08	CH13	Spare	Spare	Spare		
Spare	Spare	N1-2	A12	HLA	SL08	CH14	Spare	Spare	Spare		
Spare	Spare	N1-2	A12	HLA	SL08	CH15	Spare	Spare	Spare		
Spare	Spare	N1-2	A12	HLA	SL08	CH16	Spare	Spare	Spare		
Spare	Spare	N1-2	A12	HLA	SL08	CH17	Spare	Spare	Spare		
Spare	Spare	N1-2	A12	HLA	SL08	CH18	Spare	Spare	Spare		
Spare	Spare	N1-2	A12	HLA	SL08	CH19	Spare	Spare	Spare		
Spare	Spare	N1-2	A12	HLA	SL08	CH20	Spare	Spare	Spare		
Spare	Spare	N1-2	A12	HLA	SL08	CH21	Spare	Spare	Spare		
Spare	Spare	N1-2	A12	HLA	SL08	CH22	Spare	Spare	Spare		
Spare	Spare	N1-2	A12	HLA	SL08	CH23	Spare	Spare	Spare		

### N1-2 MDM Channel Assignments

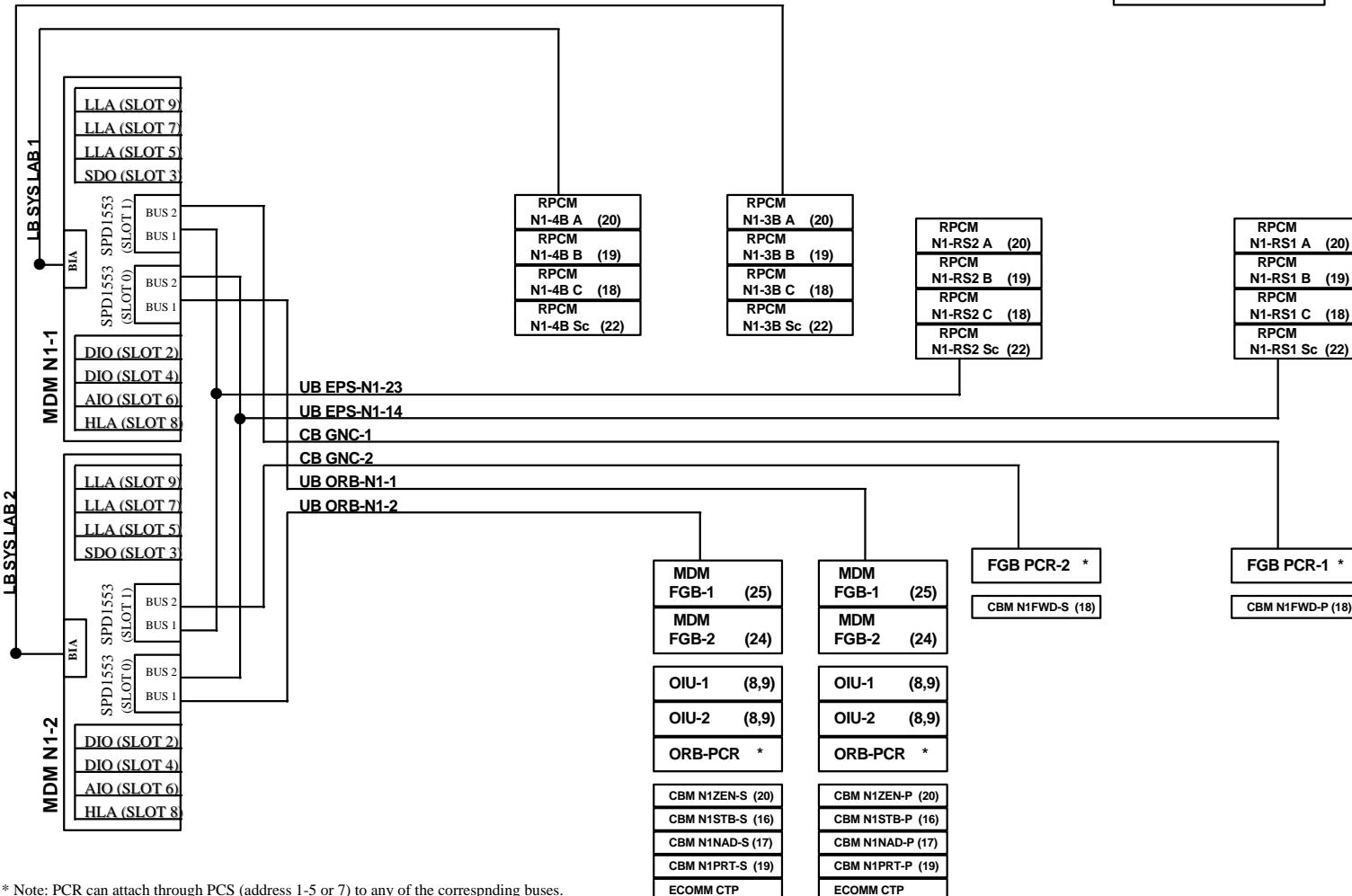
Name	Description	MDM	Card Refdes	Card Type	Slot No.	Chnl No.	Chnl Type	ISS Element	OPS Position	Flight Activation	Flight Deactivation
Spare	Spare	N1-2	A12	HLA	SL08	CH24	Spare	Spare	Spare		
Spare	Spare	N1-2	A12	HLA	SL08	CH25	Spare	Spare	Spare		
Spare	Spare	N1-2	A12	HLA	SL08	CH26	Spare	Spare	Spare		
Spare	Spare	N1-2	A12	HLA	SL08	CH27	Spare	Spare	Spare		
Spare	Spare	N1-2	A12	HLA	SL08	CH28	Spare	Spare	Spare		
Spare	Spare	N1-2	A12	HLA	SL08	CH29	Spare	Spare	Spare		
Spare	Spare	N1-2	A12	HLA	SL08	CH30	Spare	Spare	Spare		
Spare	Spare	N1-2	A12	HLA	SL08	CH31	Spare	Spare	Spare		
SSMDM N1-1 RTD Meas	MDM PMA1-1 RTD Meas	N1-2	A02	LLA	SL09	CH00	A	PMA-1	TCS		
Press Shl PMA1 RTD-6 Meas	PMA-1 Shell RTD-6 Meas	N1-2	A02	LLA	SL09	CH01	B	PMA-1	TCS	2A	AC
Press Shl PMA1 RTD-7 Meas	PMA-1 Shell RTD-7 Meas	N1-2	A02	LLA	SL09	CH02	B	PMA-1	TCS	2A	AC
Press Shl PMA1 RTD-8 Meas	PMA-1 Shell RTD-8 Meas	N1-2	A02	LLA	SL09	CH03	A	PMA-1	TCS	2A	AC
Press Shl PMA1 RTD-9 Meas	PMA-1 Shell RTD-9 Meas	N1-2	A02	LLA	SL09	CH04	B	PMA-1	TCS		
Press Shl PMA1 RTD-10 Meas	PMA-1 Shell RTD-10 Meas	N1-2	A02	LLA	SL09	CH05	A	PMA-1	TCS	2A	AC
Psiv APAS PMA3 Htch RTD-1 Meas	PMA-3 APAS Hatch RTD-1 Meas	N1-2	A02	LLA	SL09	CH06	A	PMA-3	TCS	3A	16A
Pslv APAS PMA3 Htch RTD-2 Meas	PMA-3 APAS Hatch RTD-2 Meas	N1-2	A02	LLA	SL09	CH07	B	PMA-3	TCS	3A	16A
Psiv APAS PMA3 Htch RTD-3 Meas	PMA-3 APAS Hatch RTD-3 Meas	N1-2	A02	LLA	SL09	CH08	B	PMA-3	TCS	3A	16A
Psiv APAS PMA3 Htch RTD-4 Meas	PMA-3 APAS Hatch RTD-4 Meas	N1-2	A02	LLA	SL09	CH09	A	PMA-3	TCS	3A	16A
Press Shl PMA3 RTD-1 Meas	PMA-3 Shell RTD-1 Meas	N1-2	A02	LLA	SL09	CH10	A	PMA-3	TCS	3A	16A
Press Shl PMA3 RTD-2 Meas	PMA-3 Shell RTD-2 Meas	N1-2	A02	LLA	SL09	CH11	B	PMA-3	TCS	3A	16A
Press Shl PMA3 RTD-3 Meas	PMA-3 Shell RTD-3 Meas	N1-2	A02	LLA	SL09	CH12	A	PMA-3	TCS	3A	16A
Press Shl PMA3 RTD-4 Meas	PMA-3 Shell RTD-4 Meas	N1-2	A02	LLA	SL09	CH13	B	PMA-3	TCS	3A	16A
Press Shl PMA3 RTD-5 Meas	PMA-3 Shell RTD-5 Meas	N1-2	A02	LLA	SL09	CH14	B	PMA-3	TCS	3A	16A
Press Shl PMA3 RTD-6 Meas	PMA-3 Shell RTD-6 Meas	N1-2	A02	LLA	SL09	CH15	A	PMA-3	TCS	3A	16A
Press Shl PMA3 RTD-7 Meas	PMA-3 Shell RTD-7 Meas	N1-2	A02	LLA	SL09	CH16	B	PMA-3	TCS	3A	16A
Press Shl PMA3 RTD-8 Meas	PMA-3 Shell RTD-8 Meas	N1-2	A02	LLA	SL09	CH17	A	PMA-3	TCS	3A	16A
Press Shl PMA3 RTD-9 Meas	PMA-3 Shell RTD-9 Meas	N1-2	A02	LLA	SL09	CH18	A	PMA-3	TCS	3A	16A
Press Shl PMA3 RTD-10 Meas	PMA-3 Shell RTD-10 Meas	N1-2	A02	LLA	SL09	CH19	B	PMA-3	TCS	3A	16A
Spare	Spare	N1-2	A02	LLA	SL09	CH20	Spare	Spare	Spare		
Spare	Spare	N1-2	A02	LLA	SL09	CH21	Spare	Spare	Spare		
CMGEA-1 RTD-1 Meas	CMGEA-1 RTD-1 Meas	N1-2	A02	LLA	SL09	CH22	B	FGB	MCS		
CMGEA-1 RTD-2 Meas	CMGEA-1 RTD-2 Meas	N1-2	A02	LLA	SL09	CH23	A	ITS-Z1	MCS		
CMGEA-4 RTD-1 Meas	CMGEA-4 RTD-1 Meas	N1-2	A02	LLA	SL09	CH24	A	ITS-Z1	MCS		
CMGEA-4 RTD-2 Meas	CMGEA-4 RTD-2 Meas	N1-2	A02	LLA	SL09	CH25	B	ITS-Z1	MCS		
Spare	Spare	N1-2	A02	LLA	SL09	CH26		Spare	Spare		
Spare	Spare	N1-2	A02	LLA	SL09	CH27		Spare	Spare		
SPDA Z1-3B Util Rail RTD-2 Meas	SPDA Z1-3B Util Rail RTD-2 Meas	N1-2	A02	LLA	SL09	CH28	B	ITS-Z1	EPS		
Spare	Spare	N1-2	A02	LLA	SL09	CH29	Spare	Spare	Spare		
Spare	Spare	N1-2	A02	LLA	SL09	CH30	Spare	Spare	Spare		

**N1-2 MDM Channel Assignments**

Name	Description	MDM	Card Refdes	Card Type	Slot No.	Chnl No.	Chnl Type	ISS Element	OPS Position	Flight Activation	Flight Deactivation
SPDA Z1-4B Util Rail RTD-1 Meas	SPDA Z1-4B Util Rail RTD-1 Meas	N1-2	A02	LLA	SL09	CH31	B	ITS-Z1	EPS		

# 1553 Bus Assignments - 2A & Subs

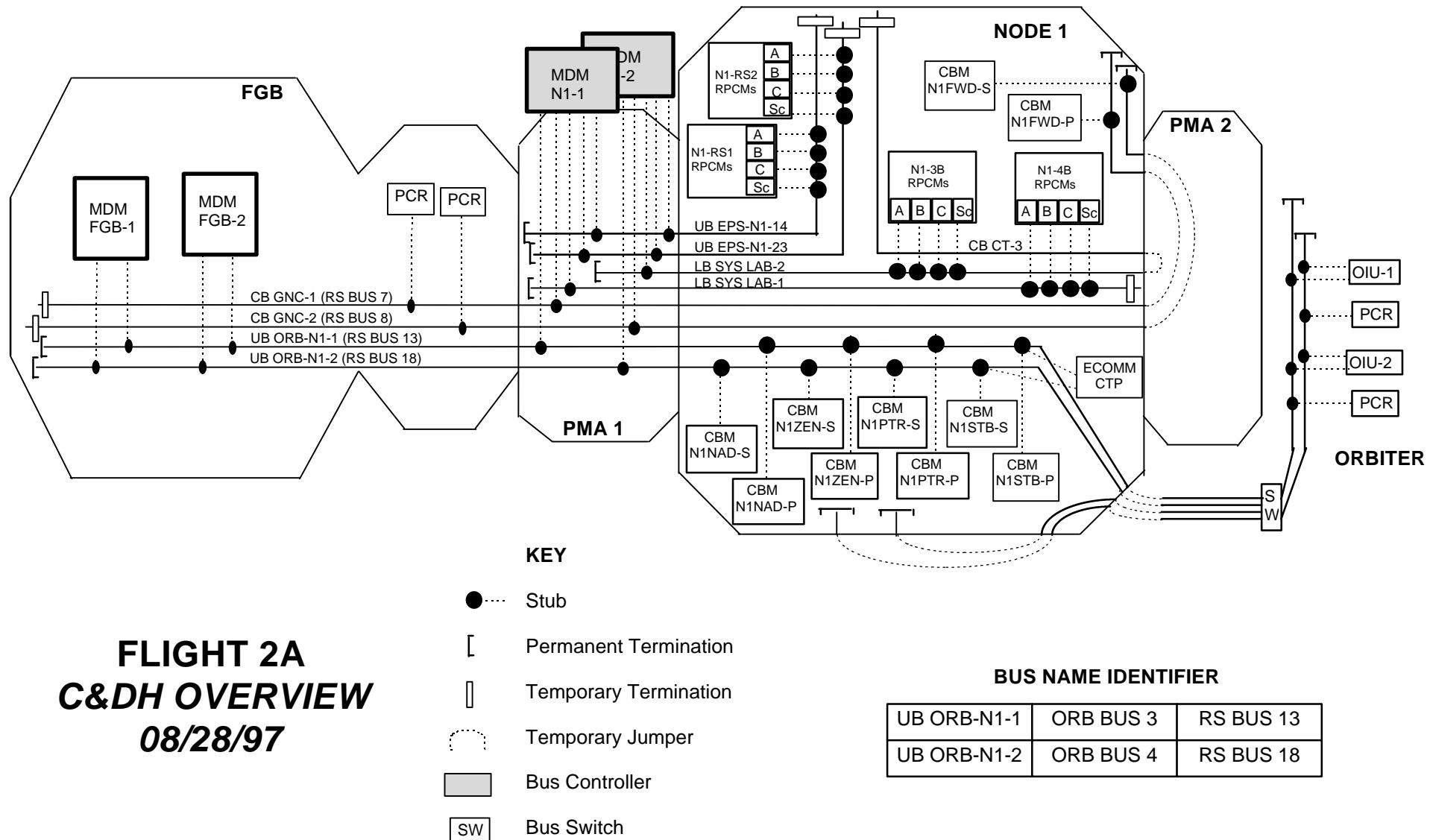
(RT addresses in parenthesis.)



\* Note: PCR can attach through PCS (address 1-5 or 7) to any of the corresponding buses.

## INPUT/OUTPUT CARDS

I/O Card	Typical Uses	Number of Channels
Low Level Analog (LLA)	Reads analog voltage or supplies the current source to measure the voltage drop across a Resistive Temperature Device. Mainly used for precise temperature measurements.	32
High Level Analog (HLA)	Reads analog sensors, such as pressure, flow rate, and speed, and supplies power for transducers.	32
Analog Input Output (AIO)	Drives analog effectors (fan speeds, valve speeds) and reads analog sensor voltage.	16
Digital Input Output (DIO)	Reads discrete sensors (valve/switch positions) and commands discrete effectors (valve/switch enable).	32
Solenoid Driver Output (SDO)	Activates and deactivates solenoids and valves. Drives effectors that require a separate power source but routed through MDM.	16



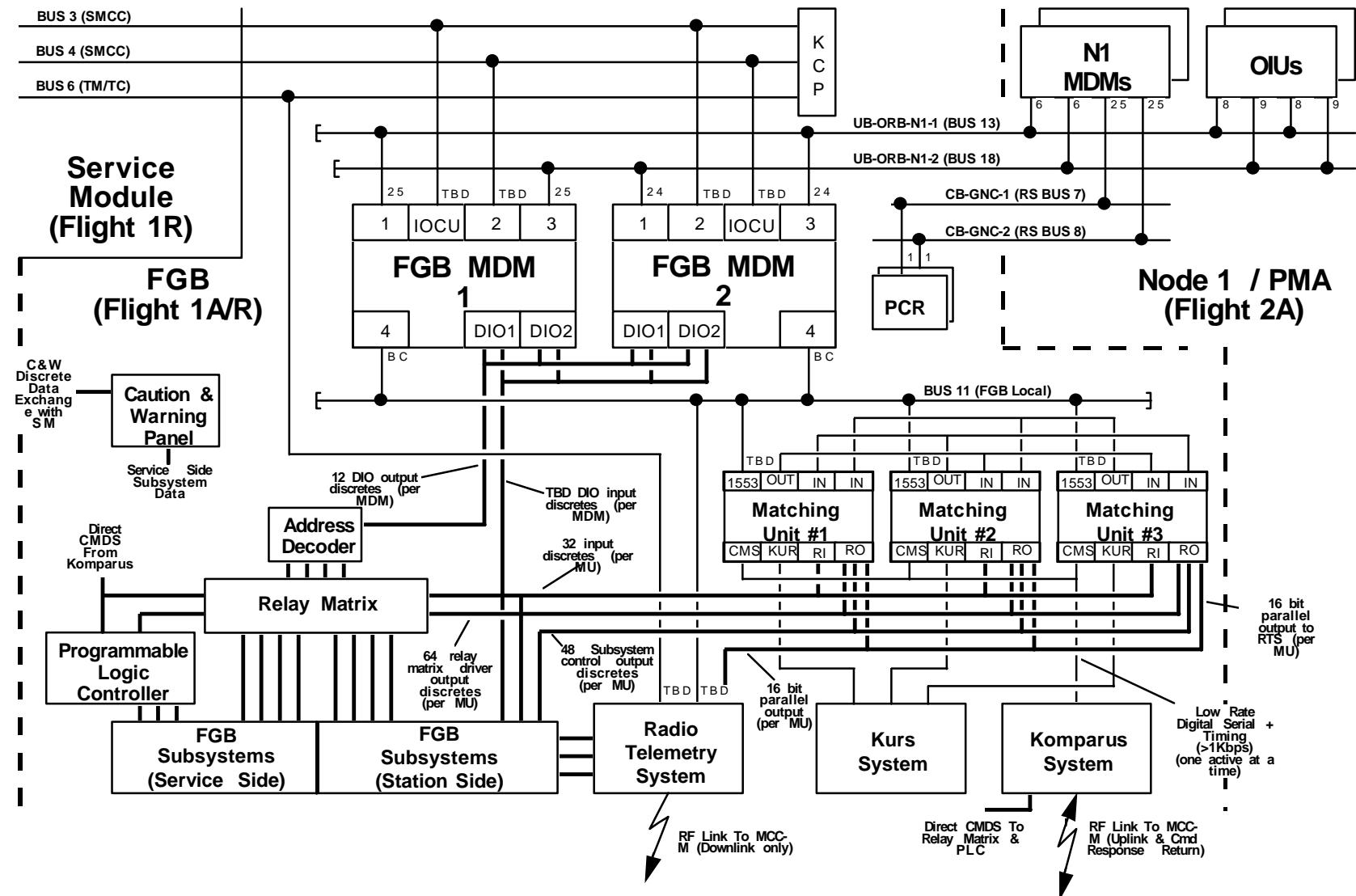
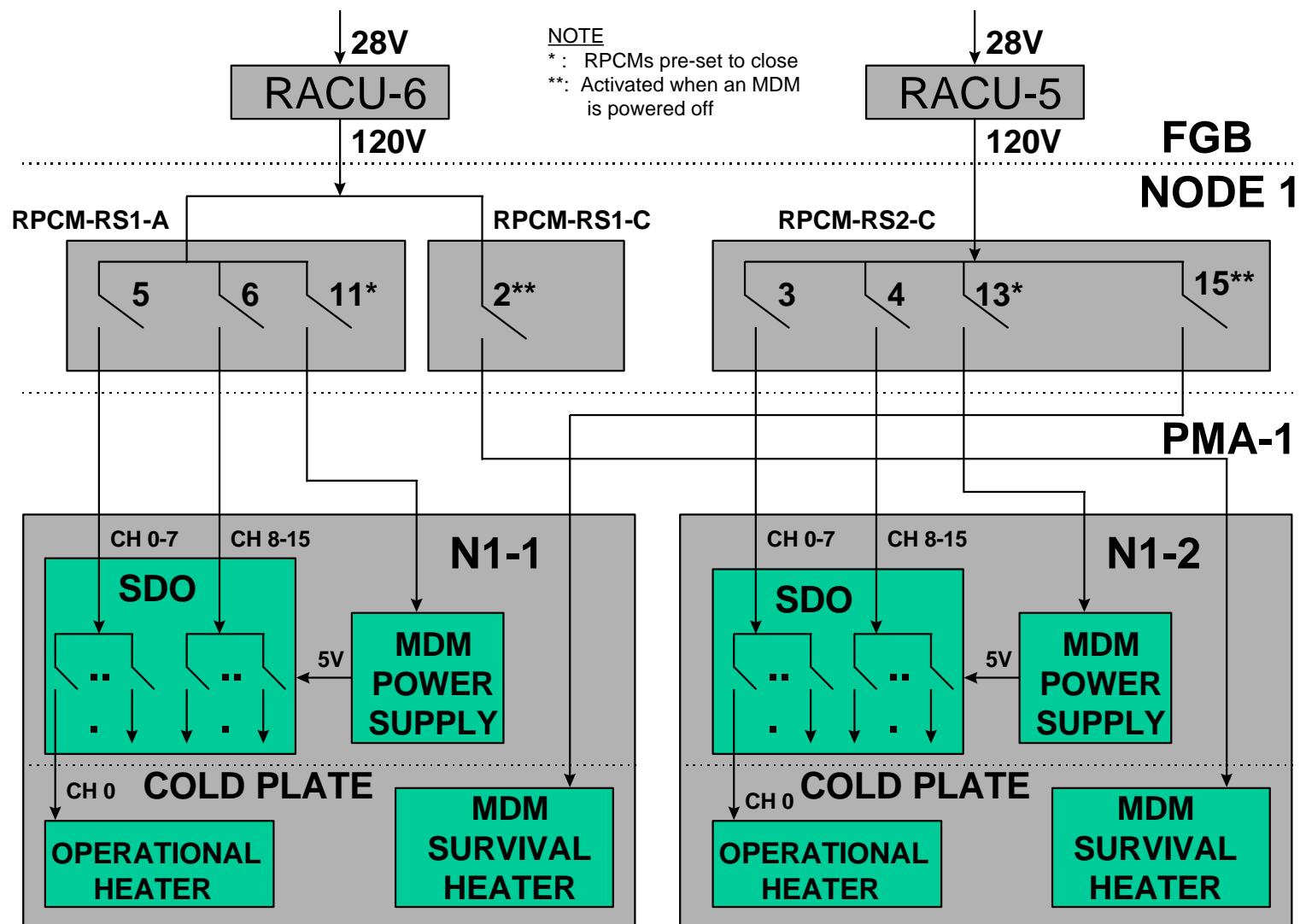


Figure 1. FGB Computer System Hardware Block Diagram



## LOAD SHED TABLE OVERLAY VERSIONS

Version 1: Node heaters, PMA heaters and Early Comm (nominal)

PUI	Command
M1TH95SM1272K	Nod1_Htr1A_Inh
M1TH95SM1297K	Nod1_Htr1B_Inh
M1TH95SM1273K	Nod1_Htr2A_Inh
M1TH95SM1298K	Nod1_Htr2B_Inh
M1TH95SM1274K	Nod1_Htr3A_Inh
M1TH95SM1299K	Nod1_Htr3B_Inh
M1TH95SM1275K	Nod1_Htr4A_Inh
M1TH95SM1300K	Nod1_Htr4B_Inh
M1TH95SM1276K	Nod1_Htr5A_Inh
M1TH95SM1301K	Nod1_Htr5B_Inh
M1TH95SM1277K	Nod1_Htr6A_Inh
M1TH95SM1302K	Nod1_Htr6B_Inh
M1TH95SM1278K	Nod1_Htr7A_Inh
M1TH95SM1303K	Nod1_Htr7B_Inh
M1TH95SM1279K	Nod1_Htr8A_Inh
M1TH95SM1304K	Nod1_Htr8B_Inh
M1TH95SM1280K	Nod1_Htr9A_Inh
M1TH95SM1305K	Nod1_Htr9B_Inh
M1TH95SM1281K	PMA1_Htr1A_Inh
M1TH95SM1306K	PMA1_Htr1B_Inh
M1TH95SM1307K	PMA1_Htr2B_Inh
M1TH95SM1283K	PMA1_Htr3A_Inh
M1TH95SM1308K	PMA1_Htr3B_Inh
M1TH95SM1284K	PMA1_Htr4A_Inh
M1TH95SM1285K	PMA1_Htr5A_Inh
M1TH95SM1310K	PMA1_Htr5B_Inh
M1PR95SM2085K	RPCM_N1RS1_C_RPC_05_CBM_N1_Stbd _Sec_1_Op ( <i>Early Comm</i> )
M1PR95SM2086K	RPCM_N1RS1_C_RPC_06_CBM_N1_Stbd _Sec_2_Op ( <i>Early Comm</i> )
M1PR95SM2092K	RPCM_N1RS1_C_RPC_12_CBM_N1_Stbd _Sec_3_Op ( <i>Early Comm</i> )
M1PR95SM2093K	RPCM_N1RS1_C_RPC_13_CBM_N1_Stbd _Sec_4_Op ( <i>Early Comm</i> )
M1PR95SM2139K	RPCM_N1RS2_A_RPC_05_CBM_N1_Stbd _Pri_1_Op ( <i>Early Comm</i> )
M1PR95SM2140K	RPCM_N1RS2_A_RPC_06_CBM_N1_Stbd _Pri_2_Op ( <i>Early Comm</i> )
M1PR95SM2144K	RPCM_N1RS2_A_RPC_10_CBM_N1_Stbd _Pri_3_Op ( <i>Early Comm</i> )
M1PR95SM2145K	RPCM_N1RS2_A_RPC_11_CBM_N1_Stbd _Pri_4_Op ( <i>Early Comm</i> )

## LOAD SHED TABLE OVERLAY VERSIONS(Cont)

Version 2: Node heaters and PMA heaters

PUI	Command
M1TH95SM1272K	Nod1_Htr1A_Inh
M1TH95SM1297K	Nod1_Htr1B_Inh
M1TH95SM1273K	Nod1_Htr2A_Inh
M1TH95SM1298K	Nod1_Htr2B_Inh
M1TH95SM1274K	Nod1_Htr3A_Inh
M1TH95SM1299K	Nod1_Htr3B_Inh
M1TH95SM1275K	Nod1_Htr4A_Inh
M1TH95SM1300K	Nod1_Htr4B_Inh
M1TH95SM1276K	Nod1_Htr5A_Inh
M1TH95SM1301K	Nod1_Htr5B_Inh
M1TH95SM1277K	Nod1_Htr6A_Inh
M1TH95SM1302K	Nod1_Htr6B_Inh
M1TH95SM1278K	Nod1_Htr7A_Inh
M1TH95SM1303K	Nod1_Htr7B_Inh
M1TH95SM1279K	Nod1_Htr8A_Inh
M1TH95SM1304K	Nod1_Htr8B_Inh
M1TH95SM1280K	Nod1_Htr9A_Inh
M1TH95SM1305K	Nod1_Htr9B_Inh
M1TH95SM1281K	PMA1_Htr1A_Inh
M1TH95SM1306K	PMA1_Htr1B_Inh
M1TH95SM1307K	PMA1_Htr2B_Inh
M1TH95SM1283K	PMA1_Htr3A_Inh
M1TH95SM1308K	PMA1_Htr3B_Inh
M1TH95SM1284K	PMA1_Htr4A_Inh
M1TH95SM1285K	PMA1_Htr5A_Inh
M1TH95SM1310K	PMA1_Htr5B_Inh

## LOAD SHED TABLE OVERLAY VERSIONS(Cont)

Version 3: Node heaters and Early Comm

PUI	Command
M1TH95SM1272K	Nod1_Htr1A_Inh
M1TH95SM1297K	Nod1_Htr1B_Inh
M1TH95SM1273K	Nod1_Htr2A_Inh
M1TH95SM1298K	Nod1_Htr2B_Inh
M1TH95SM1274K	Nod1_Htr3A_Inh
M1TH95SM1299K	Nod1_Htr3B_Inh
M1TH95SM1275K	Nod1_Htr4A_Inh
M1TH95SM1300K	Nod1_Htr4B_Inh
M1TH95SM1276K	Nod1_Htr5A_Inh
M1TH95SM1301K	Nod1_Htr5B_Inh
M1TH95SM1277K	Nod1_Htr6A_Inh
M1TH95SM1302K	Nod1_Htr6B_Inh
M1TH95SM1278K	Nod1_Htr7A_Inh
M1TH95SM1303K	Nod1_Htr7B_Inh
M1TH95SM1279K	Nod1_Htr8A_Inh
M1TH95SM1304K	Nod1_Htr8B_Inh
M1TH95SM1280K	Nod1_Htr9A_Inh
M1TH95SM1305K	Nod1_Htr9B_Inh
M1PR95SM2085K	RPCM_N1RS1_C_RPC_05_CBM_N1_Stbd_Pri_1_Op <i>(Early Comm)</i>
M1PR95SM2086K	RPCM_N1RS1_C_RPC_06_CBM_N1_Stbd_Pri_2_Op <i>(Early Comm)</i>
M1PR95SM2092K	RPCM_N1RS1_C_RPC_12_CBM_N1_Stbd_Sec_1_Op <i>(Early Comm)</i>
M1PR95SM2093K	RPCM_N1RS1_C_RPC_13_CBM_N1_Stbd_Sec_2_Op <i>(Early Comm)</i>
M1PR95SM2139K	RPCM_N1RS2_A_RPC_05_CBM_N1_Stbd_Pri_3_Op <i>(Early Comm)</i>
M1PR95SM2140K	RPCM_N1RS2_A_RPC_06_CBM_N1_Stbd_Pri_4_Op <i>(Early Comm)</i>
M1PR95SM2144K	RPCM_N1RS2_A_RPC_10_CBM_N1_Stbd_Sec_3_Op <i>(Early Comm)</i>
M1PR95SM2145K	RPCM_N1RS2_A_RPC_11_CBM_N1_Stbd_Sec_4_Op <i>(Early Comm)</i>

## **LOAD SHED TABLE OVERLAY VERSIONS(Cont)**

Version 4: Node heaters

PUI	Command
M1TH95SM1272K	Nod1_Htr1A_Inh
M1TH95SM1297K	Nod1_Htr1B_Inh
M1TH95SM1273K	Nod1_Htr2A_Inh
M1TH95SM1298K	Nod1_Htr2B_Inh
M1TH95SM1274K	Nod1_Htr3A_Inh
M1TH95SM1299K	Nod1_Htr3B_Inh
M1TH95SM1275K	Nod1_Htr4A_Inh
M1TH95SM1300K	Nod1_Htr4B_Inh
M1TH95SM1276K	Nod1_Htr5A_Inh
M1TH95SM1301K	Nod1_Htr5B_Inh
M1TH95SM1277K	Nod1_Htr6A_Inh
M1TH95SM1302K	Nod1_Htr6B_Inh
M1TH95SM1278K	Nod1_Htr7A_Inh
M1TH95SM1303K	Nod1_Htr7B_Inh
M1TH95SM1279K	Nod1_Htr8A_Inh
M1TH95SM1304K	Nod1_Htr8B_Inh
M1TH95SM1280K	Nod1_Htr9A_Inh
M1TH95SM1305K	Nod1_Htr9B_Inh

## **LOAD SHED TABLE OVERLAY VERSIONS(Cont)**

## Version 5: Blank (i.e., no entries)

## LOAD SHED TABLE OVERLAY VERSIONS(Cont)

Version 6: All Node1 Loads \*

PUI	Command
M1TH95SM1272K	Nod1_Htr1A_Inh
M1TH95SM1297K	Nod1_Htr1B_Inh
M1TH95SM1273K	Nod1_Htr2A_Inh
M1TH95SM1298K	Nod1_Htr2B_Inh
M1TH95SM1274K	Nod1_Htr3A_Inh
M1TH95SM1299K	Nod1_Htr3B_Inh
M1TH95SM1275K	Nod1_Htr4A_Inh
M1TH95SM1300K	Nod1_Htr4B_Inh
M1TH95SM1276K	Nod1_Htr5A_Inh
M1TH95SM1301K	Nod1_Htr5B_Inh
M1TH95SM1277K	Nod1_Htr6A_Inh
M1TH95SM1302K	Nod1_Htr6B_Inh
M1TH95SM1278K	Nod1_Htr7A_Inh
M1TH95SM1303K	Nod1_Htr7B_Inh
M1TH95SM1279K	Nod1_Htr8A_Inh
M1TH95SM1304K	Nod1_Htr8B_Inh
M1TH95SM1280K	Nod1_Htr9A_Inh
M1TH95SM1305K	Nod1_Htr9B_Inh
M1TH95SM1281K	PMA1_Htr1A_Inh
M1TH95SM1306K	PMA1_Htr1B_Inh
M1TH95SM1307K	PMA1_Htr2B_Inh
M1TH95SM1283K	PMA1_Htr3A_Inh
M1TH95SM1308K	PMA1_Htr3B_Inh
M1TH95SM1284K	PMA1_Htr4A_Inh
M1TH95SM1285K	PMA1_Htr5A_Inh
M1TH95SM1310K	PMA1_Htr5B_Inh
M1PR95SM2085K	RPCM_N1RS1_C_RPC_05_CBM_N1_Stbd_Pri_1_Op <i>(Early Comm)</i>
M1PR95SM2086K	RPCM_N1RS1_C_RPC_06_CBM_N1_Stbd_Pri_2_Op <i>(Early Comm)</i>
M1PR95SM2092K	RPCM_N1RS1_C_RPC_12_CBM_N1_Stbd_Sec_1_Op <i>(Early Comm)</i>
M1PR95SM2093K	RPCM_N1RS1_C_RPC_13_CBM_N1_Stbd_Sec_2_Op <i>(Early Comm)</i>
M1PR95SM2139K	RPCM_N1RS2_A_RPC_05_CBM_N1_Stbd_Pri_3_Op <i>(Early Comm)</i>
M1PR95SM2140K	RPCM_N1RS2_A_RPC_06_CBM_N1_Stbd_Pri_4_Op <i>(Early Comm)</i>
M1PR95SM2144K	RPCM_N1RS2_A_RPC_10_CBM_N1_Stbd_Sec_3_Op <i>(Early Comm)</i>
M1PR95SM2145K	RPCM_N1RS2_A_RPC_11_CBM_N1_Stbd_Sec_4_Op <i>(Early Comm)</i>
M1PR95SM1977K	RPCM_N1RS1_A_RPC_05_MDM_N1-1_SDO_1A
M1PR95SM1978K	RPCM_N1RS1_A_RPC_06_MDM_N1-1_SDO_1B
M1PR95SM1983K	RPCM_N1RS1_A_RPC_11_MDM_N1-1
M1PR95SM2245K	RPCM_N1RS2_C_RPC_03_MDM_N1-2_SDO_1A
M1PR95SM2246K	RPCM_N1RS2_C_RPC_04_MDM_N1-2_SDO_1B
M1PR95SM2255K	RPCM_N1RS2_C_RPC_13_MDM_N1-2

\* NOTE: The RPC open inhibits will be managed operationally to ensure only one MDM will be powered-off during a loadshed event.

## 2A POWER BUS CONNECTIVITY

	BUS LOST	EQUIPMENT LOST	FUNCTION/EQUIPMENT REDUNDANCY LOST	CONTROL/INSTRUMENTATION LOST
	RPDA N1RS1			
R A C U 6	RPCM N1RS1 A	RPC 1: N1 Htr 1A RPC 2: N1 Htr 2A RPC 3: N1 Htr 3A RPC 4: N1 Htr 4A RPC 5: N1-1 SDO Card 1A RPC 6: N1-1 SDO Card 1B RPC 11: N1-1 MDM RPC 12: N1 Htr 5A RPC 13: N1 Htr 6A RPC 14: N1 Htr 7A RPC 15: N1 Htr 8A RPC 16: N1 Htr 9A	1 of 2 Node1 MDMs (N1-1) 1 of 2 Node1 Shell Heater Strings (N1 A Heaters)	Control of RPCM N14B A, B, and C Instrumentation from RPCM N14B A, B, and C
	RPCM N1RS1 B	RPC 5: CBM N1 Port Sec 1 RPC 6: CBM N1 Port Sec 2 RPC 13: CBM N1 Port Sec 3 RPC 14: CBM N1 Port Sec 4	1 of 2 Port CBM power sources	
	RPCM N1RS1 C	RPC 1: PMA1 Htr 1A RPC 2: MDM N1-2 Srv Htr RPC 5: CBM N1 Stbd Sec 1 (Early Comm Port Ant Pwr) RPC 6: CBM N1 Stbd Sec 2 (Early Comm Port Ant Htr) RPC 12: CBM N1 Stbd Sec 3 (Early Comm Stbd Ant Pwr) RPC 13: CBM N1 Stbd Sec 4 (Early Comm Stbd Ant Htr) RPC 14: PMA1 Htr 3A RPC 15: PMA1 Htr 4A RPC 16: PMA1 Htr 5A	1 of 2 PMA1 Shell Heater Strings (PMA1 A Heaters) 1 of 2 Stbd CBM power sources	Early Comm Command and Telemetry

## 2A POWER BUS CONNECTIVITY(Cont)

BUS LOST	EQUIPMENT LOST	FUNCTION/EQUIPMENT REDUNDANCY LOST	CONTROL/INSTRUMENTATION LOST
R A C U 5	RPDA N1RS2		
	RPCM N1RS2 A	RPC 1: N1 Htr 1B RPC 2: N1 Htr 2B RPC 3: N1 Htr 3B RPC 4: N1 Htr 4B RPC 5: CBM N1 Stbd Pri 1 (Early Comm Transceiver Pwr & Htr) RPC 6: CBM N1 Stbd Pri 2 (Early Comm Spare) RPC 10: CBM N1 Stbd Pri 3 (Early Comm CTP) RPC 11: CBM N1 Stbd Pri 4 (Early Comm RFPDB) RPC 12: N1 Htr 5B RPC 13: N1 Htr 6B RPC 14: N1 Htr 7B RPC 15: N1 Htr 8B RPC 16: N1 Htr 9B	1 of 2 Node1 Shell Heater Strings (N1 B Heaters) 1 of 2 Stbd CBM power sources  Early Comm Command and Telemetry
	RPCM N1RS2 B	None	
	RPCM N1RS2 C	RPC 1: PMA1 Htr 1B RPC 2: PMA1 Htr 2B RPC 3: N1-2 SDO Card 1A RPC 4: N1-2 SDO Card 1B RPC 7: CBM N1 Port Pri 1 RPC 8: CBM N1 Port Pri 2 RPC 10: CBM N1 Port Pri 3 RPC 11: CBM N1 Port Pri 4 RPC 13: N1-2 MDM RPC 14: PMA1 Htr 3B RPC 15: MDM N1-1 Srv Htr RPC 16: PMA1 Htr 5B	1 of 2 Node1 MDMs (N1-2) 1 of 2 PMA1 Shell Heater Strings (PMA1 A Heaters) 1 of 2 Port CBM power sources  Control of RPCM N13B A, B, and C Instrumentation from RPCM N13B A, B, and C

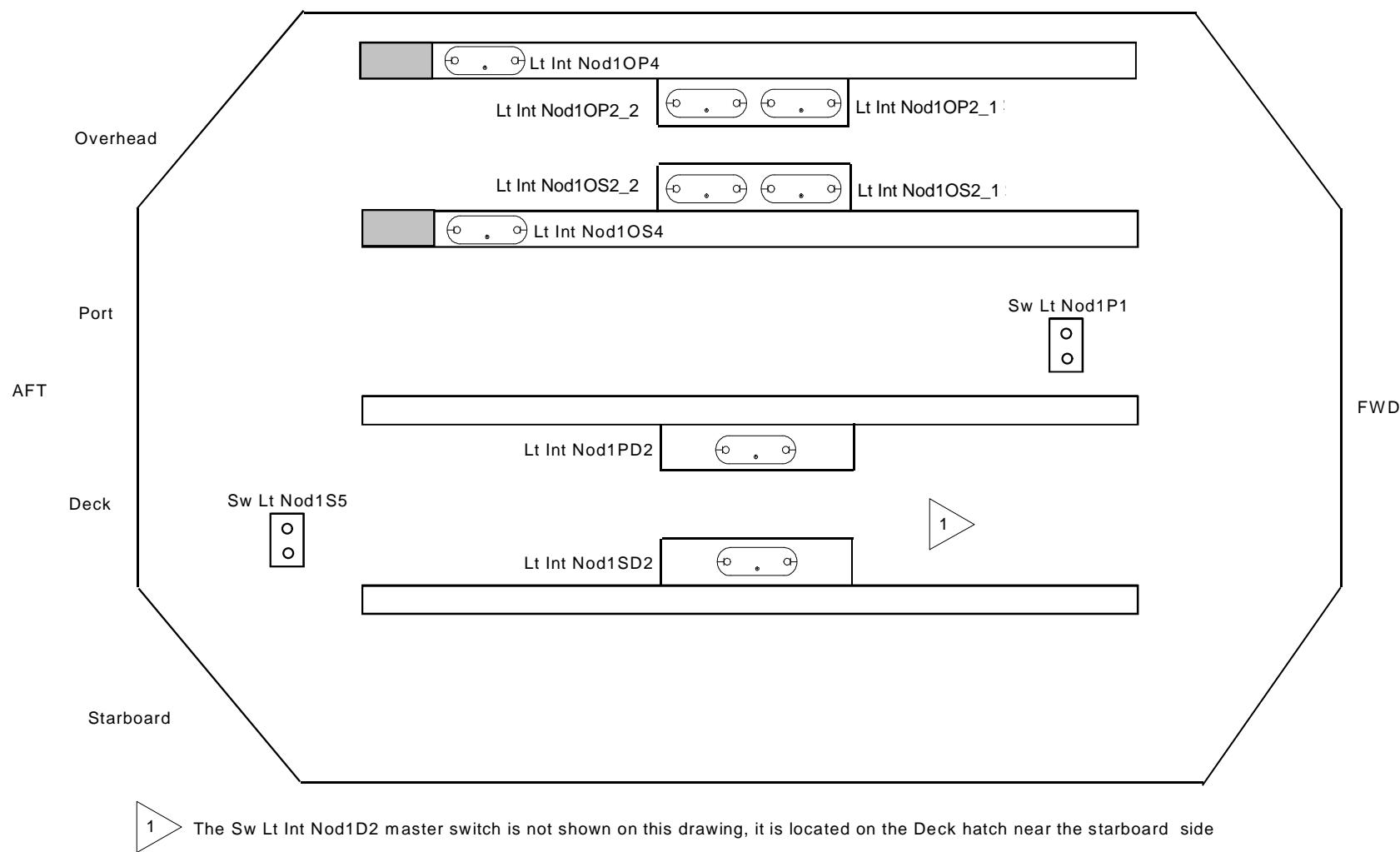
## 2A POWER BUS CONNECTIVITY(Cont)

	BUS LOST	EQUIPMENT LOST	FUNCTION/EQUIPMENT REDUNDANCY LOST	CONTROL/INSTRUMENTATION LOST
	RPDA N13B			
A P C U 1	RPCM N13B A	RPC 4: IMV Stbd Aft Fan RPC 5: Lt Int NOD1OS4 RPC 13: Lt Int NOD1OS2-1 RPC 16: SD 2	Power to Interior Lights	
	RPCM N13B B	RPC 1: Lt Int NOD1PD2 RPC 3: CBM N1 Nad Pri 1 RPC 4: CBM N1 Nad Pri 2 RPC 5: CBM N1 Nad Pri 3 RPC 6: CBM N1 Nad Pri 4 RPC 11: CBM N1 Zen Pri 1 RPC 12: CBM N1 Zen Pri 2 RPC 13: CBM N1 Zen Pri 3 RPC 14: CBM N1 Zen Pri 4 RPC 15: IMV Deck Aft Vlv RPC 16: IMV Deck Fwd Vlv	Power to Interior Lights 1 of 2 Nad CBM power sources 1 of 2 Zen CBM power sources	
	RPCM N13B C	RPC 1: Lt Int NOD1OS2-2 RPC 3: CBM N1 Fwd Pri 1 RPC 4: CBM N1 Fwd Pri 2 RPC 5: CBM N1 Fwd Pri 3 RPC 6: CBM N1 Fwd Pri 4 RPC 13: IMV Fwd Stbd Vlv RPC 14: IMV Fwd Port Vlv RPC 16: IMV Port Fwd Fan	Power to Interior Lights 1 of 2 Fwd CBM power sources	

## 2A POWER BUS CONNECTIVITY(Cont)

	BUS LOST	EQUIPMENT LOST	FUNCTION/EQUIPMENT REDUNDANCY LOST	CONTROL/INSTRUMENTATION LOST
	RPDA N14B			
A P C U 2	RPCM N14B A	RPC 2: CBM N1 Fwd Sec 1 RPC 3: CBM N1 Fwd Sec 2 RPC 14: CBM N1 Fwd Sec 3 RPC 15: CBM N1 Fwd Sec 4 RPC 16: IMV Stbd Fwd Vlv	1 of 2 Fwd CBM power sources	
	RPCM N14B B	RPC 1: Lt Int NOD1SD2 RPC 3: CBM N1 Zen Sec 1 RPC 4: CBM N1 Zen Sec 2 RPC 5: CBM N1 Zen Sec 3 RPC 6: CBM N1 Zen Sec 4 RPC 11: CBM N1 Nad Sec 1 RPC 12: CBM N1 Nad Sec 2 RPC 13: CBM N1 Nad Sec 3 RPC 14: CBM N1 Nad Sec 4 RPC 16: RAMV RPC 17: Cab Fan	Power to Interior Lights 1 of 2 Zen CBM power sources 1 of 2 Nad CBM power sources	
	RPCM N14B C	RPC 2: Lt Int NOD1OP4 RPC 3: SD 1 RPC 4: IMV Aft Stbd Vlv RPC 5: IMV Aft Port Vlv RPC 12: IMV Aft Port Fan RPC 13: IMV Stbd Aft Vlv RPC 14: IMV Port Fwd Vlv RPC 15: Lt Int NOD1OP2-1 RPC 16: Lt Int NOD1OP2-2	Power to Interior Lights	

### NODE 1 INTERNAL LIGHT LOCATIONS



## APCU STATUS DISPLAY

	1	2	3	4	5
1	12345678901	12345678901	12345678901	12345678901	12345678901
2	XXXX/200/XXX	APCU STATUS	XX X	DDD/HH/MM/SS	DDD/HH/MM/SS
3					
4		APCU 1	APCU 2		
5					
6	CONV A				
7	OUT AMPS	XX.X	XX.X		
8	TEMP	XXX.X	XXX.X		
9	CONV B				
10	OUT AMPS	XX.X	XX.X		
11	TEMP	XXX.X	XXX.X		
12	OUT VOLTS				
13	RES LOW	XXX.X	XXX.X		
14	RES HIGH	XXX.X	XXX.X		
15	TRIP	X.XX	X.XX		
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					

The APCU STATUS display is an SM display (DISP 200) available in SM OPS 2 and 4 which provides output power, thermal, and trip data on the Assembly Power Converter Unit.

### PARAMETER CHARACTERISTICS: SM 200 APCU STATUS DISPLAY

CRT NAME	UNITS	DISPLAYED	STATUS INDICATORS					FDA LIMITS	
			M	H	L	↑	↓	Lower	Upper
APCU 1									
CONV A									
OUT AMPS	Amps	0 to 12	M	H		↑		0SL	7.5 A
TEMP	°F	0 to 212	M	H		↑		0SL	120 °F
CONV B									
OUT AMPS	Amps	0 to 12	M	H		↑		0SL	7.5 A
TEMP	°F	0 to 212	M	H		↑		0SL	120 °F
OUT VOLTS									
RES LOW	volts	0 to 180	M	H	L	↑	↓	0SL	05 H
HIGH	volts	110 to 160	M	H	L	↑	↓	122 V	130 V
TRIP	[1]	volts see remarks	M	H		↑		0SL	-4.60 V

PARAMETER CHARACTERISTICS: SM 200 APCU STATUS DISPLAY (Cont)

CRT NAME	UNITS	DISPLAYED	STATUS INDICATORS					FDA LIMITS	
			M	H	L	↑	↓	Lower	Upper
APCU 2									
CONV A									
OUT AMPS	Amps	0 to 12	M	H		↑		OSL	7.5 A
TEMP	°F	0 to 212	M	H		↑		OSL	120 °F
CONV B									
OUT AMPS	Amps	0 to 12	M	H		↑		OSL	7.5 A
TEMP	°F	0 to 212	M	H		↑		OSL	120 °F
OUT VOLTS									
RES LOW	volts	0 to 180	M	H	L	↑	↓	OSL	05 H
HIGH	volts	110 to 160	M	H	L	↑	↓	122 V	130 V
TRIP	[1]	volts	see remarks		M	H	↑	OSL	-4.60 V

REMARKS

[1] The TRIP status voltage can be interpreted using the following table.

TRIP (STATUS VOLTAGE)	TRIP CAUSE(S)			
	OV	OUV	OC	IUV
+4.88	X	X	X	X
+4.23	X	X	X	
+3.59	X	X		X
+2.95	X	X		
+2.27	X		X	X
+1.62	X		X	
+0.98	X			X
+0.34	X			
-0.30		X	X	X
-0.95		X	X	
-1.59		X		X
-2.23		X		
-2.91			X	X
-3.56			X	
-4.20				X
-4.48 (NO TRIP)				

NOTES:

OV: Output Overvoltage  
 OUV: Output Undervoltage  
 OC: Output Overcurrent  
 IUV: Input Undervoltage

The tolerance for all reported voltages is ± 0.2 volts.

## SPEC 201 CBM CONTROL DISPLAY

1	2	3	4	5
123456789012345678901234567890123456789012345678901				
XXXX/201/XXX	CBM CONTROL	XX X	DDD/HH:MM:SS	
			DDD/HH:MM:SS	
<b>ALL STOP 1</b>		BOLT	CMDST	POS LOAD
XXXX	COND CMD	1-1	XXXX	XXX.X XXXXX.XX
CBM CONF 2	R SAFE 19	2	XXXX	XXX.X XXXXX.XX
	XXX	3	XXXX	XXX.X XXXXX.XX
	M/S	SAFVAL 20	4	XXXX XXX.X XXXXX.XX
3 ZEN X X/X	RESET 18	1-2	XXXX	XXX.X XXXXX.XX
4 NAD X X/X	MSTR STAT	2	XXXX	XXX.X XXXXX.XX
5 FWD X X/X	XXXX	3	XXXX	XXX.X XXXXX.XX
6 STB X X/X	21 MASK	XX 4	XXXX	XXX.X XXXXX.XX
7 PORT X X/X	12345	1-3	XXXX	XXX.X XXXXX.XX
		1XXXXXX	2	XXXX XXX.X XXXXX.XX
BOLTCK 8	2XXXXXX	3	XXXX	XXX.X XXXXX.XX
ABOLT 1ST 9	3XXXXXX	4	XXXX	XXX.X XXXXX.XX
	2ND 10	4XXXXXX	1-4	XXXX XXX.X XXXXX.XX
	3RD 11	RTL	2	XXXX XXX.X XXXXX.XX
	4TH 12	1 XX SS	3	XXXX XXX.X XXXXX.XX
IBOLT 13	2 XX SS	4	XXXX	XXX.X XXXXX.XX
FBOLT 14	3 XX SS	LAT	CMDST	ANG CAPSW
	4 XX SS	1	XXXX	XXX XX SS
LAT DEPLOY 15	CLOSE	22	2	XXXX XXX XX SS
CAPTURE-1 16			3	XXXX XXX XX SS
CAPTURE-2 17			4	XXXX XXX XX SS

PARAMETER CHARACTERISTICS: SM 201 CBM CONTROL DISPLAY

CRT NAME	MSID	UNITS	DISPLAY RANGE	STATUS INDICATORS					FDA (Limits)	
				H	L	M	↑	↓	HI	LO
'CONFIRMATION REQUEST' [1]	P79X0627E, P79X0628E, P79X0629E, P79X0630E, P79X0631E	-----	NONE, RSAF, UBLT, STOP, BIT, CAPT, BBLT, DBLT, ABLTL, MASK, RSET, DPLY, CLOS, FBLT, IBLT, LBLT, RBLT, INIT						----	----
ZEN M (MONITOR FIELD)	P79X0606E, P79X0607E	-----	D = DEACTIVATED A = ACTIVATED M = MONITOR						----	----
ZEN S	P82K5959J, P82K5960J	-----	0 = NO CONTROLLER SELECTED, 1 = PRIME (MASTER) CNTLR 2 = SECONDARY CONTROLLER						----	----
NAD M (MONITOR FIELD)	P79X0608E, P79X0609E	-----	D = DEACTIVATED A = ACTIVATED M = MONITOR						----	----
NAD S	P82K5961J, P82K5962J	-----	0 = NO CONTROLLER SELECTED, 1 = PRIME (MASTER) CNTLR 2 = SECONDARY CONTROLLER						----	----
FWD M (MONITOR FIELD)	P79X0610E, P79X0611E	-----	D = DEACTIVATED A = ACTIVATED M = MONITOR						----	----

PARAMETER CHARACTERISTICS: SM 201 CBM CONTROL DISPLAY (Cont)

CRT NAME	MSID	UNITS	DISPLAY RANGE	STATUS INDICATORS					FDA (Limits)	
				H	L	M	↑	↓	HI	LO
FWD S	P82K5967J, P82K5968J	-----	0 = NO CONTROLLER SELECTED, 1 = PRIME (MASTER) CNTLR 2 = SECONDARY CONTROLLER						----	----
STB M (MONITOR FIELD)	P79X0612E, P79X0613E	-----	D = DEACTIVATED A = ACTIVATED M = MONITOR						----	----
STB S	P82K5963J, P82K5964J	-----	0 = NO CONTROLLER SELECTED, 1 = PRIME (MASTER) CNTLR 2 = SECONDARY CONTROLLER						----	----
PORT M (MONITOR FIELD)	P79X0614E, P79X0615E	-----	D = DEACTIVATED A = ACTIVATED M = MONITOR						----	----
PORT S	P82K5965J, P82K5966J	-----	0 = NO CONTROLLER SELECTED, 1 = PRIME (MASTER) CNTLR 2 = SECONDARY CONTROLLER						----	----
MSTR STAT	P79X0091E, P79X0524E, P79X0525E, P79X0526E	-----	CPLT, PROG, PEND, ABRT, FAIL, TIME						----	----
RTL 1	P79X0163E, P79X0164E	-----	O = OPENED C = CLOSED					↓	----	----

## PARAMETER CHARACTERISTICS: SM 201 CBM CONTROL DISPLAY (Cont)

PARAMETER CHARACTERISTICS: SM 201 CBM CONTROL DISPLAY (Cont)

CRT NAME	MSID	UNITS	DISPLAY RANGE	STATUS INDICATORS					FDA (Limits)	
				H	L	M	↑	↓	HI	LO
POSITION BOLT 1-2	P79X0036A	Revs.	0 --- 51						TBD	TBD
POSITION BOLT 1-3	P79X0037A	Revs.	0 --- 51						TBD	TBD
POSITION BOLT 1-4	P79X0044A	Revs.	0 --- 51						TBD	TBD
POSITION BOLT 2-1	P79X0035A	Revs.	0 --- 51						TBD	TBD
POSITION BOLT 2-2	P79X0038A	Revs.	0 --- 51						TBD	TBD
POSITION BOLT 2-3	P79X0039A	Revs.	0 --- 51						TBD	TBD
POSITION BOLT 2-4	P79X0045A	Revs.	0 --- 51						TBD	TBD
POSITION BOLT 3-1	P79X0040A	Revs.	0 --- 51						TBD	TBD
POSITION BOLT 3-2	P79X0041A	Revs.	0 --- 51						TBD	TBD
POSITION BOLT 3-3	P79X0046A	Revs.	0 --- 51						TBD	TBD
POSITION BOLT 3-4	P79X0047A	Revs.	0 --- 51						TBD	TBD
POSITION BOLT 4-1	P79X0042A	Revs.	0 --- 51						TBD	TBD
POSITION BOLT 4-2	P79X0043A	Revs.	0 --- 51						TBD	TBD
POSITION BOLT 4-3	P79X0048A	Revs.	0 --- 51						TBD	TBD
POSITION BOLT 4-4	P79X0049A	Revs.	0 --- 51						TBD	TBD
BOLT LOAD 1-1	P79G0002A	POUNDS	-1 to 25,000						TBD	TBD
BOLT LOAD 1-2	P79G0006A	POUNDS	-1 to 25,000						TBD	TBD
BOLT LOAD 1-3	P79G0008A	POUNDS	-1 to 25,000						TBD	TBD
BOLT LOAD 1-4	P79G0022A	POUNDS	-1 to 25,000						TBD	TBD
BOLT LOAD 2-1	P79G0004A	POUNDS	-1 to 25,000						TBD	TBD
BOLT LOAD 2-2	P79G0010A	POUNDS	-1 to 25,000						TBD	TBD
BOLT LOAD 2-3	P79G0012A	POUNDS	-1 to 25,000						TBD	TBD
BOLT LOAD 2-4	P79G0024A	POUNDS	-1 to 25,000						TBD	TBD
BOLT LOAD 3-1	P79G0014A	POUNDS	-1 to 25,000						TBD	TBD

PARAMETER CHARACTERISTICS: SM 201 CBM CONTROL DISPLAY (Cont)

CRT NAME	MSID	UNITS	DISPLAY RANGE	STATUS INDICATORS					FDA (Limits)	
				H	L	M	↑	↓	HI	LO
BOLT LOAD 3-2	P79G0016A	POUNDS	-1 to 25,000						TBD	TBD
BOLT LOAD 3-3	P79G0026A	POUNDS	-1 to 25,000						TBD	TBD
BOLT LOAD 3-4	P79G0029A	POUNDS	-1 to 25,000						TBD	TBD
BOLT LOAD 4-1	P79G0042A	POUNDS	-1 to 25,000						TBD	TBD
BOLT LOAD 4-2	P79G0043A	POUNDS	-1 to 25,000						TBD	TBD
BOLT LOAD 4-3	P79G0048A	POUNDS	-1 to 25,000						TBD	TBD
BOLT LOAD 4-4	P79G0049A	POUNDS	-1 to 25,000						TBD	TBD
LAT CMD STAT 1	P79X0093E	-----	CPLT, PROG, FAIL, BIND, INTF, STRP, NOEN, NOAD, MALF, MISS, JAMD, MSBD, ABRT						-----	-----
LAT CMD STAT 2	P79X0097E								-----	-----
LAT CMD STAT 3	P79X0101E								-----	-----
LAT CMD STAT 4	P79X0105E								-----	-----
LATCH SHAFT POSITION 1 (ANG)	P79H0051A	Revs.	0 --- 51						TBD	TBD
LATCH SHAFT POSITION 2 (ANG)	P79H0053A	Revs.	0 --- 51						TBD	TBD
LATCH SHAFT POSITION 3 (ANG)	P79H0055A	Revs.	0 --- 51						TBD	TBD
LATCH SHAFT POSITION 4 (ANG)	P79H0057A	Revs.	0 --- 51						TBD	TBD
CAP SW -1 (left)	P79X0165E	EVENT	1 = O (OPEN)/ 0 = Blank					↓	-----	-----
-1 (right)	P79X0166E	EVENT	1 = C (CLOSED)/ 0 = Blank					↓	-----	-----
-2 (left)	P79X0174E	EVENT	1 = O (OPEN)/ 0 = Blank					↓	-----	-----
-2 (right)	P79X0175E	EVENT	1 = C (CLOSED)/ 0 = Blank					↓	-----	-----

PARAMETER CHARACTERISTICS: SM 201 CBM CONTROL DISPLAY (Cont)

CRT NAME	MSID	UNITS	DISPLAY RANGE	STATUS INDICATORS					FDA (Limits)	
				H	L	M	↑	↓	HI	LO
CAP SW -3 (left)	P79X0183E	EVENT	1 = O (OPEN)/ 0 = Blank					↓	-----	-----
-3 (right)	P79X0184E	EVENT	1 = C (CLOSED)/ 0 = Blank					↓	-----	-----
-4 (left)	P79X0192E	EVENT	1 = O (OPEN)/ 0 = Blank					↓	-----	-----
-4 (right)	P79X0193E	EVENT	1 = C (CLOSED)/ 0 = Blank					↓	-----	-----

## REMARKS

- [1] The four-character field below displays 'CONF'. It is the 'confirmation request' field where the commanded process in work is displayed upon execution of an 'ITEM 2 EXEC'.
- [2] Bolt Command Status, Position, and Loads are to the right of each bolt. For the Command Status, each controller has a particular four-character field to denote if the command is: in progress, failed, if binding is detected, if interference is detected, if missed capture is detected, if stripping is detected, if there is a no engaged condition, if there is a not adjusted condition, if a malfunction is detected, if missing capture is detected, if a jam is detected, if a command missed a broadcast, and if a command was aborted. The user is cued from this field in the event a command has to be masked or if ground intervention is required.

Bolt position is identified to the right of the Command Stat field, and shows the progress of bolt rotation for each once commands are issued. The user can use this cue to determine if a slowdown or jam can be anticipated. This is a good bolt progress column for the user.

Bolt Load is displayed at the right of the display. With each bolt force command increasing as the sequence progresses, the crew can use this cue to determine if an I\_Bolt or F\_Bolt command needs to be present.

- [3] For each of the four capture latches at the bottom right, similar columns provide the user with latch insight as with the bolts above. Latch command status is similar to the range of four-character fields for the bolt commands above. Latch angle shows the range of full latch extension to the retracted position.

The Capture Switch, along with the position switch, shows whether a particular latch missed the incoming passive segment. An 'O' or 'C' under the 'CA' of the header 'CAPSW' will indicate when a latch switch is open or closed. Under 'SW' of the header a status field will indicate if an open circuit or switch short is evident with a down arrow displayed.

## ITEM ENTRY CHARACTERISTICS: SM 201 CBM CONTROL DISPLAY

Items 1 and 2: Item 1 is an all stop command to be used in the event the crew needs to stop any controller activity that could be considered a problem. This is boxed on top as to allow rapid identification and execution. The four-character field below displays 'CONF.' It is the 'confirmation request' field where the commanded process in work is displayed upon execution of an 'ITEM 2 EXEC'. Addendum AA shows the various text feedbacks. The command is a two-step MDM software process to override the firmware command validation step or to send a command which the firmware considers non-default (nominally sent during the ABOLT command).

Below the CBM Confirm Item 2 are the CBM activation hex entries for powering up the opening desired.

Items 3 --- 7: These will be mission unique and will represent Node 1 for early assembly flights and Node 2 for the later flights. These commands will be given to the "active" side of the CBM desired usually at the node interface. 'ITEM 3+1 EXEC' will select a primary (master) controller. 'ITEM 3+2 EXEC' will select a secondary controller. In each case the index number is displayed in the hex field as a crew cue as to which was selected. This is the beginning of the nominal procedures after the power up steps. Item 3 will select the Zenith CBM items 4, 5, 6, and 7 work similarly if procedures require these to be activated.

The 'M/S' fields adjacent to the index field shows the user whether the CBM is activated, deactivated, or in the Monitor state. An 'A' is displayed if activated, a 'D' is displayed if deactivated, and an 'M' is displayed if in the monitor state. The 'S' field displays a 0, 1, 2, or 3 and shows the user if the CBM selected is using no controller, a prime controller, or a backup controller. These correspond to the activate and deactivate command.

Items 8 --- 12: The 'BOLTCK' command 'ITEM 8 EXEC' drives all 16 bolts out 2 turns and in 3 turns. This is a test of the bolt and motor operation to ensure they work as desired prior to the mating operation. The 'ITEM 9 EXEC' rotates the first group of four bolts (each 90 degrees apart) and they will drive out to acquire the passive corresponding nuts. Items 10, 11, and 12 will do the same respectively. These are the 'Acquire' or 'Abolt' commands.

Item 13: IBOLT - command continues the bolting process but takes all bolts to a higher load (automatically sequenced four at a time). Nominally, these commands will be sent several times in a row to ensure proper bolt loads are delivered.

Item 14: FBOLT - command continues the bolt torque until the bolts are taken to their final load. This command is sent several times to ensure the bolts reach their final load.

Item 15: LAT DEPLOY - command sends out the latches (4) from the retracted position in preparation to grapple the passive portion of the CBM of the component to be berthed.

Item 16: CAPTURE-1 - command moves all four capture latches in the first step of a two-step sequence, moving the latches to the 150° position.

- Item 17: CAPTURE-2 - command moves all four capture latches in the first step of a two-step sequence, moving the latches to the 150° position.
- Item 18: RESET - a reset command similar to that on a home computer. It allows a restart if the software sequences lock up.
- Item 19: R SAFE - the Contingency Command 'ITEM 19 EXEC' which starts a sequence of three commands to start the process of CBM support of the 20 minute separation requirement for a fast getaway of the Orbiter should that become necessary. Note: the second command in this sequence is the CBM\_Confirmation\_Command. Upon successful completion of this event, a 'VAL' appears below item 19 prompting the operator to be sure they really want to initiate Rapid Safing.
- Item 20: SAFVAL - 'ITEM 20 EXEC' is the third of three commands that are required to start the process of mating the CBM automatically to support the Shuttle 20 minute sep requirement (the second command is the CBM\_Confirmation\_Command).
- Items 21: Above item 21 is the field for the Master Stat Code. This four-character telemetry field tells the user the status of the Master Controller assigned (ie: whether a command is in complete, in progress, pending, aborted, failed, or has timed out.) The addendum Q defines the bit combinations that generate the text fields.
- MASK - 'ITEM 21 + XX', the Mask Bolt commands, are indexed item entries. The XX are integers that are: 11, 12, 13, 14, 15, 21, 22, 23, 24, 25, 31, 32, 33, 34, 35, 41, 42, 43, 44, and 45, each correspond to the bolt groups. All other hex entries will result in an 'ILLEGAL ENTRY' message. These commands are defined in addendum 'F' of the keyboard processing table.
- These are grouped in a matrix to mask a single or multiple controller failure should that malfunction happen. This is a contingency area on the display which, when a certain actuator is masked, an asterisk is driven at the appropriate X,Y coordinate of the controller/actuator being masked. For example, if an 'ITEM 21+ 22 EXEC' is entered, an asterisk is driven adjacent the vertical column at 2 and under the horizontal column at 2. This command deselects the actuator/controller 2-2. There is a group 5 listed there and these are the latch controller/actuators that can be masked similarly as with the bolts.
- The Ready To Latch (RTL) area below is a discrete feedback field on the display to provide the RMS operator with a series of alpha characters 'O' for an Open or 'C' for a Closed indication for each of four latches. The characters indicate whether the CBM is in the capture envelope for the latch that corresponds to that specific RTL. Adjacent to each latch is a pair of stand alone status that (left to right) provide insight to a switch short or an open circuit respectively, in either case if a down arrow is displayed if the event has occurred.
- Item 22: CLOSE - the command that mates the active with the passive CBM segment in preparation for the bolt driving process.

## SPEC 202 CBM POWER DISPLAY

	1	2	3	4	5
1	123456789012345678901234567890123456789012345678901	CBM POWER	XX X	DDD/MM/SS	
2	XXXX/202/XXX			DDD/MM/SS	
3					
4	PRI ON/OFF	SEC ON/OFF	PRI ON/OFF	SEC ON/OFF	
5	TRIP	TRIP	TRIP	TRIP	
6	FORWARD			AFT	
7	1 1X 2X S	25X 26X S			
8	2 3X 4X S	27X 28X S			
9	3 5X 6X S	29X 30X S			
10	4 7X 8X S	31X 32X S			
11					
12		PORT		STARBOARD	
13	1 9X 10X S	33X 34X S	1 49X 50X S	65X 66X	S
14	2 11X 12X S	35X 36X S	2 51X 52X S	67X 68X S	
15	3 13X 14X S	37X 38X S	3 53X 54X S	69X 70X S	
16	4 15X 16X S	39X 40X S	4 55X 56X S	71X 72X S	
17					
18		ZENITH		NADIR	
19	1 17X 18X S	41X 42X S	1 57X 58X S	73X 74X S	
20	2 19X 20X S	43X 44X S	2 59X 60X S	75X 76X S	
21	3 21X 22X S	45X 46X S	3 61X 62X S	77X 78X S	
22	4 23X 24X S	47X 48X S	4 63X 64X S	79X 80X S	
23					
24					

PARAMETER CHARACTERISTICS: SM 202 CBM POWER DISPLAY

CRT NAME	MSID	DISPLAY RANGE	STATUS INDICATORS				
			H	L	M	↑	↓
FORWARD PRI 1 TRIP	P79X0427E	1 = YES, 0 = NO					↓
FORWARD PRI 2 TRIP	P79X0428E	1 = YES, 0 = NO					↓
FORWARD PRI 3 TRIP	P79X0429E	1 = YES, 0 = NO					↓
FORWARD PRI 4 TRIP	P79X0430E	1 = YES, 0 = NO					↓
PORT PRI 1 TRIP	P79X0468E	1 = YES, 0 = NO					↓
PORT PRI 2 TRIP	P79X0469E	1 = YES, 0 = NO					↓
PORT PRI 3 TRIP	P79X0471E	1 = YES, 0 = NO					↓
PORT PRI 4 TRIP	P79X0472E	1 = YES, 0 = NO					↓
ZENITH PRI 1 TRIP	P79X0422E	1 = YES, 0 = NO					↓
ZENITH PRI 2 TRIP	P79X0423E	1 = YES, 0 = NO					↓
ZENITH PRI 3 TRIP	P79X0424E	1 = YES, 0 = NO					↓
ZENITH PRI 4 TRIP	P79X0425E	1 = YES, 0 = NO					↓
FORWARD SEC 1 TRIP	P79X0432E	1 = YES, 0 = NO					↓
FORWARD SEC 2 TRIP	P79X0433E	1 = YES, 0 = NO					↓
FORWARD SEC 3 TRIP	P79X0434E	1 = YES, 0 = NO					↓
FORWARD SEC 4 TRIP	P79X0432E	1 = YES, 0 = NO					↓
PORT SEC 1 TRIP	P79X0456E	1 = YES, 0 = NO					↓
PORT SEC 2 TRIP	P79X0457E	1 = YES, 0 = NO					↓
PORT SEC 3 TRIP	P79X0459E	1 = YES, 0 = NO					↓
PORT SEC 4 TRIP	P79X0460E	1 = YES, 0 = NO					↓
ZENITH SEC 1 TRIP	P79X0438E	1 = YES, 0 = NO					↓
ZENITH SEC 2 TRIP	P79X0439E	1 = YES, 0 = NO					↓
ZENITH SEC 3 TRIP	P79X0440E	1 = YES, 0 = NO					↓
ZENITH SEC 4 TRIP	P79X0441E	1 = YES, 0 = NO					↓
STARBOARD PRI 1 TRIP	P79X0462E	1 = YES, 0 = NO					↓
STARBOARD PRI 2 TRIP	P79X0463E	1 = YES, 0 = NO					↓
STARBOARD PRI 3 TRIP	P79X0465E	1 = YES, 0 = NO					↓
STARBOARD PRI 4 TRIP	P79X0466E	1 = YES, 0 = NO					↓

PARAMETER CHARACTERISTICS: SM 202 CBM POWER DISPLAY (Cont)

CRT NAME	MSID	DISPLAY RANGE	STATUS INDICATORS				
			H	L	M	↑	↓
NADIR PRI 1 TRIP	P79X0520E	1 = YES, 0 = NO					↓
NADIR PRI 2 TRIP	P79X0521E	1 = YES, 0 = NO					↓
NADIR PRI 3 TRIP	P79X0522E	1 = YES, 0 = NO					↓
NADIR PRI 4 TRIP	P79X0523E	1 = YES, 0 = NO					↓
STARBOARD SEC 1 TRIP	P79X0474E	1 = YES, 0 = NO					↓
STARBOARD SEC 2 TRIP	P79X0475E	1 = YES, 0 = NO					↓
STARBOARD SEC 3 TRIP	P79X0477E	1 = YES, 0 = NO					↓
STARBOARD SEC 4 TRIP	P79X0478E	1 = YES, 0 = NO					↓
NADIR SEC 1 TRIP	P79X0443E	1 = YES, 0 = NO					↓
NADIR SEC 2 TRIP	P79X0444E	1 = YES, 0 = NO					↓
NADIR SEC 3 TRIP	P79X0445E	1 = YES, 0 = NO					↓
NADIR SEC 4 TRIP	P79X0446E	1 = YES, 0 = NO					↓

## ITEM ENTRY CHARACTERISTICS: SM 202 CBM POWER DISPLAY

Items 1 and 2: FORWARD PRI RPC 3 ON (OFF) - applies power to and powers off the Forward Primary circuit 1. Items 1 and 2 are power up and power down commands of the RPC 3 circuit. Those bolts and latches would lose power if the circuit were tripped (see the CBM Control display for the specific bolts and latch). Upon completion of each command, an asterisk is driven adjacent to the item number. The corresponding trip field will indicate a tripped circuit and will cause an asterisk and a down arrow to be driven in the parameter status column if the appropriate discrete is set high. Accompanying the tripped indication, a fault message is driven on the message line indicating the source of the tripped circuit.

The power primary and secondary parameter fields are in partitioned groups of four. There are groups of bolts and latches that are powered by each group under the header of primary and secondary. Each of the groups have a dedicated RPC for that group. (A check of the specific components powered by the RPC's and RPCMs is found in the Electrical Power Architecture Workbook).

Items 25 and 26: The Secondary circuit fields are displayed similarly to the Primary circuits.

Items 3 and 4: FORWARD PRI RPC 4 ON (OFF) - similarly power the bolts and latch tied to the RPC 4 circuit.

Items 27 and 28: The Secondary circuit fields are displayed similarly to the Primary circuits.

Items 5 and 6: FORWARD PRI RPC 5 ON (OFF) - similarly be powered by RPC 5.

Items 29 and 30: The Secondary circuit fields are displayed similarly to the Primary circuits.

Items 7 and 8: FORWARD PRI RPC 6 ON (OFF) - similarly be powered by RPC 6.

Items 31 and 32: The Secondary circuit fields are displayed similarly to the Primary circuits.

Items 9 and 10: PORT PRI RPC 3 ON (OFF) - applies power to and powers off the Port Primary circuit 1. Items 9 and 10 are power up and power down commands of the RPC 3 circuit. Those bolts and latches would lose power if the circuit were tripped (see the CBM Control display for the specific bolts and latch). Upon completion of each command, an asterisk is driven adjacent to the item number. The corresponding trip field will indicate a tripped circuit and will cause an asterisk and a down arrow to be driven in the parameter status column if the appropriate discrete is set high. Accompanying the tripped indication, a fault message is driven on the message line indicating the source of the tripped circuit.

The power primary and secondary parameter fields are in partitioned groups of four. There are groups of bolts and latches that are powered by each group under the header of primary and secondary. Each of the groups have a dedicated RPC for that group. (A check of the specific components powered by the RPCs and RPCMs is found in the Electrical Power Architecture Workbook).

- Items 33 and 34: The Secondary circuit fields are displayed similarly to the Primary circuits.
- Items 11 and 12: PORT PRI RPC 4 ON (OFF) - similarly be powered by RPC 4.
- Items 35 and 36: The Secondary circuit fields are displayed similarly to the Primary circuits.
- Items 13 and 14: PORT PRI RPC 5 ON (OFF) - similarly be powered by RPC 5.
- Items 37 and 38: The Secondary circuit fields are displayed similarly to the Primary circuits.
- Items 15 and 16: FORWARD PRI RPC 6 ON (OFF) - similarly be powered by RPC 6.
- Items 39 and 40: The Secondary circuit fields are displayed similarly to the Primary circuits.
- Items 17 and 18: ZENITH PRI RPC 3 ON (OFF) - applies power to and powers off the Zenith Primary circuit 1. Items 17 and 18 are power up and power down commands of the RPC 3 circuit. Those bolts and latches would lose power if the circuit were tripped (see the CBM Control display for the specific bolts and latch). Upon completion of each command, an asterisk is driven adjacent to the item number. The corresponding trip field will indicate a tripped circuit and will cause an asterisk and a down arrow to be driven in the parameter status column if the appropriate discrete is set high. Accompanying the tripped indication, a fault message is driven on the message line indicating the source of the tripped circuit.

The power primary and secondary parameter fields are in partitioned groups of four. There are groups of bolts and latches that are powered by each group under the header of primary and secondary. Each of the groups have a dedicated RPC for that group. (A check of the specific components powered by the RPCs and RPCMs is found in the Electrical Power Architecture Workbook).

- Items 41 and 42: The Secondary circuit fields are displayed similarly to the Primary circuits.
- Items 19 and 20: ZENITH PRI RPC 4 ON (OFF) - similarly power the bolts and latch tied to the RPC 4 circuit.
- Items 43 and 44: The Secondary circuit fields are displayed similarly to the Primary circuits.
- Items 21 and 22: ZENITH PRI RPC 5 ON (OFF) - similarly be powered by RPC 5.
- Items 45 and 46: The Secondary circuit fields are displayed similarly to the Primary circuits.
- Items 23 and 24: ZENITH PRI RPC 6 ON (OFF) - similarly be powered by RPC 6.
- Items 47 and 48: The Secondary circuit fields are displayed similarly to the Primary circuits.

Items 49 and 50: STARBOARD PRI RPC 3 ON (OFF) - applies power to and powers off the Starboard Primary circuit 1. Items 49 and 50 are power up and power down commands of the RPC 3 circuit. Those bolts and latches would lose power if the circuit were tripped (see the CBM Control display for the specific bolts and latch). Upon completion of each command, an asterisk is driven adjacent to the item number. The corresponding trip field will indicate a tripped circuit and will cause an asterisk and a down arrow to be driven in the parameter status column if the appropriate discrete is set high. Accompanying the tripped indication, a fault message is driven on the message line indicating the source of the tripped circuit.

The power primary and secondary parameter fields are partitioned in groups of four. There are groups of bolts and latches that are powered by each group under the header of primary and secondary. Each of the groups have a dedicated RPC for that group. (A check of the specific components powered by the RPCs and RPCMs is found in the Electrical Power Architecture Workbook).

- Items 65 and 66: The Secondary circuit fields are displayed similarly to the Primary circuits.
- Items 51 and 52: STARBOARD PRI RPC 4 ON (OFF) - similarly power the bolts and latch tied to the RPC 4 circuit.
- Items 67 and 68: The Secondary circuit fields are displayed similarly to the Primary circuits.
- Items 53 and 54: STARBOARD PRI RPC 5 ON (OFF) - similarly be powered by RPC 5.
- Items 69 and 70: The Secondary circuit fields are displayed similarly to the Primary circuits.
- Items 55 and 56: STARBOARD PRI RPC 6 ON (OFF) - similarly be powered by RPC 6.
- Items 71 and 72: The Secondary circuit fields are displayed similarly to the Primary circuits.
- Items 57 and 58: NADIR PRI RPC 3 ON (OFF) - applies power to and powers off the Nadir Primary circuit 1. Items 57 and 58 are power up and power down commands of the RPC 3 circuit. Those bolts and latches would lose power if the circuit were tripped (see the CBM Control display for the specific bolts and latch). Upon completion of each command, an asterisk is driven adjacent to the item number. The corresponding trip field will indicate a tripped circuit and will cause an asterisk and a down arrow to be driven in the parameter status column if the appropriate discrete is set high. Accompanying the tripped indication, a fault message is driven on the message line indicating the source of the tripped circuit.

The power primary and secondary parameter fields are partitioned in groups of four. There are groups of bolts and latches that are powered by each group under the header of primary and secondary. Each of the groups have a dedicated RPC for that group. (A check of the specific components powered by the RPCs and RPCMs is found in the Electrical Power Architecture Workbook).

- Items 73 and 74: The Secondary circuit fields are displayed similarly to the Primary circuits.

- Items 59 and 60: NADIR PRI RPC 4 ON (OFF) - similarly power the bolts and latch tied to the RPC 4 circuit.
- Items 75 and 76: The Secondary circuit fields are displayed similarly to the Primary circuits.
- Items 61 and 62: NADIR PRI RPC 5 ON (OFF) - similarly be powered by RPC 5.
- Items 77 and 78: The Secondary circuit fields are displayed similarly to the Primary circuits.
- Items 63 and 64: NADIR PRI RPC 6 ON (OFF) - similarly be powered by RPC 6.
- Items 79 and 80: The Secondary circuit fields are displayed similarly to the Primary circuits.

## SPEC 203 EARLY COMM DISPLAY

1234567890123456789012345678901234567890123456789012345678901

1	XXXX/203/XXX	EARLY COMM	XX X	DDD/HH/MM/SS
2				DDD/HH/MM/SS
3		CL OP		
4	N1RS1C RPC	5 1X 2X	PTG MODE	
5		6 3X 4X	MANUAL	22X
6		12 5X 6X	AUTO	23X
7		13 7X 8X		
8	N1RS2A RPC	5 9X 10X	ANT SEL	
9		6 11X 12X	PORT OMNI	24X
10		10 13X 14X	STBD OMNI	25X
11		11 15X 16X		
12			26 PORT ARRAY BEAM	XX X
13		ON OFF	27 STBD ARRAY BEAM	<u>XX</u> X
14	XMIT	17X 18X		
15	DECRYPT	X 19X	BEAM SEL XX	
16	KEY	XXX		
17	POST	XXXX	SIG STR XXX	
18	CPT POST	XXXX		
19		HI LO		
20	SYS MODE	20X 21X	TEMP	I/F
21	FRM LOCK		PORT ANT XXX	XXX
22	PORTCOM	XXX	STBD ANT XXX	XXX
23	CTP	XXX	PORTCOM XXX	XXX
24	R-S RJCT	XXX	CTP XXX	
25				
26				

PARAMETER CHARACTERISTICS: SM 203 EARLY COMM DISPLAY

CRT NAME	MSID	UNITS	DISPLAY RANGE
DECRYPT ON	P79X0592E	-----	'*' = 1, blank = 0
DECRYPT KEY BIT 0/4/8	P79U0594D/ P79U0327D/ P79U0330D	-----	TBD
DECRYPT POST	P79X0595E	-----	FAIL = 1, PASS = 0
CPT POST	P79X0372E	-----	FAIL = 0, PASS = 1
FRM LOCK PORTCOM	P79X0591E	-----	YES = 1, NO = 0
FRM LOCK CTP	P79X0605E	-----	NO = 1, YES = 0
R-S RJCT [1]	P79X0590E	-----	YES = 1, NO = 0
BEAM SEL	P79U0599D	-----	TBD
SIG STR	P79U0600A	CNT	0 --- 255
PORT ANT TEMP	P79U0601A	CNT	0 --- 255
STBD ANT TEMP	P79U0602A	CNT	0 --- 255
PORTCOM TEMP	P79U0603A	CNT	0 --- 255
CTP TEMP	P79U0604A	CNT	0 --- 255
PORT ANT I/F	P79X0373E	-----	ERR = 1, OK = 0
STBD ANT I/F	P79X0374E	-----	ERR = 1, OK = 0
PORTCOM I/F	P79X0375E	-----	ERR = 1, OK = 0

REMARKS

- [1] This parameter displays 'YES' or 'NO' to indicate if forward link packets are being discarded due to Reed-Solomon rejects.

## ITEM ENTRY CHARACTERISTICS: SM 203 EARLY COMM DISPLAY

- Items 1 --- 16: N1RS1C RPC (5,6,12,13) and N1RS2A RPC (5,6,10,11) - powers on (CL) and powers off (OP) the Remote Power Controllers (RPCs) associated with the Early Communication System. An asterisk will be displayed next to the appropriate item number to indicate the open/closed status of each RPC.
- Items 17 and 18: XMIT - powers ON and OFF the Early Communication System transmitter, respectively. An asterisk will be displayed next to the appropriate item number to indicate transmitter status.
- Item 19: DECRYPT - turns OFF the Decryption function. An asterisk will be displayed next to item 19 to indicate that the decryption function is OFF; otherwise, an asterisk will be displayed under the ON column. The KEY field displays the index number of the decryption key currently in use. This value is displayed in hex. The POST field displays either 'PASS' or 'FAIL' to indicate whether or not the decryption Power On Self-Test (POST) was successful.  
  
The Command/Telemetry Processor (CTP) POST field displays either 'PASS' or 'FAIL' to indicate whether or not the CTP POST was successful.
- Items 20 and 21: SYS MODE - selects either the HI or LO system mode, respectively. An asterisk will be displayed next to the appropriate item entry to indicate the current system mode. HI mode is used for video-teleconferencing and LO mode is used for command/telemetry transmission.
- Items 22 and 23: PTG MODE - allow the crew to select either the MANUAL or AUTO pointing modes, respectively. An asterisk will be displayed next to the appropriate item entry to indicate the current mode. Normal operation of the system will be in automatic pointing mode.
- Items 24 and 25: ANT SEL - selects either the PORT or STBD OMNI antenna respectively. These commands are used when in Low Data Rate and Manual Pointing Mode only. An asterisk will be displayed next to the appropriate item entry to indicate the antenna selected regardless of pointing mode.
- Items 26 and 27: PORT or STBD ARRAY BEAM - selects either the PORT or STBD ARRAY BEAM. These commands are used in conjunction with the Automatic Pointing Mode to give the antenna pointing algorithm an initial beam reference for signal acquisition. These commands are also used for full manual control of the arrays when in Manual Pointing Mode. These are indexed commands with 64 beam selection. An asterisk is displayed to the right of the command feedback field to indicate PORT or STBD is in use.

## SPEC 204 FGB DISPLAY

1 123456789012345678901234567890123456789012345678901  
 2 123456789012345678901234567890123456789012345678901  
 3 123456789012345678901234567890123456789012345678901  
 4 123456789012345678901234567890123456789012345678901  
 5 123456789012345678901234567890123456789012345678901

1	XXXX/204/XXX	FGB	XX X	DDD/HH/MM/SS
2				DDD/HH/MM/SS
3				
4				
5	MAIN BUS	VOLTS	AMPS	
6	V1	XXX.X	XXXX.X	
7	V2	XXX.X		
8	SOLAR ARRAY		XXX.X	BC SYNC FRM CTR
9				XXXS
10	RACU 5	INP	XXX.X	COMMANDING
11		OUT	XXX.XS	CMD DIR
12				MU RDY CH 1
13	RACU 6	INP	XXX.X	2
14		OUT	XXX.XS	3
15				OCS RDY 1
16		ON	OFF	2
17	RACU 5	PWR	X	
18	VIA	FGB	1	5
19	NCS		2	6
20				BATT VOLTS CHG 1 CHG 2
21	RACU 6	PWR	X	3
22	VIA	FGB	3	4
23	NCS		4	5
24				6 XX.X XX.X XX.X XX.X
25				
26				

PARAMETER CHARACTERISTICS: SM 204 FGB DISPLAY

CRT NAME	MSID	UNITS	DISPLAY RANGE	STATUS INDICATORS					FDA (Limits)	
				M	H	L	↑	↓	HI	LO
MAIN BUS AMPS	P79C0236A	AMP	0 --- 600						N/A	N/A
MAIN BUS V1 VOLTS	P79V0270A	VDC	0 --- 40					↓	N/A	28.5
MAIN BUS V2 VOLTS	P79V0272A	VDC	0 --- 40					↓	N/A	28.5
SOLAR ARRAY AMPS	P79C0510A	AMP	0 --- 600						N/A	N/A
RACU 5 INPUT AMPS	P79C0242A	AMP	0 --- 35						N/A	N/A
RACU 5 OUTPUT VOLTS	P79V0274A	VDC	0 – 150				↑	↓	130V	118V
RACU 5 OUTPUT AMPS	P79C0238A	AMP	0 --- 80				↑		16A	N/A
RACU 6 INPUT AMPS	P79C0244A	AMP	0 --- 35						N/A	N/A
RACU 6 OUTPUT VOLTS	P79V0276A	VDC	0 --- 150				↑	↓	130V	118V
RACU 6 OUTPUT AMPS	P79C0240A	AMP	0 --- 80				↑		16A	N/A
RACU 5 POWER ON	P79X0383E	-----	'*' = 1, blank = 0						-----	-----
RACU 5 POWER OFF		-----	blank = 1, '*' = 0						-----	-----
RACU 6 POWER ON	P79X0384E	-----	'*' = 1, blank = 0						-----	-----
RACU 6 POWER OFF		-----	blank = 1, '*' = 0						-----	-----
BC SYNC [1]	P79X0211E	-----	YES = 0, NO = 1					↓	N/A	1
FRM CTR [2]	P79U0116D	-----	INCREMENT						-----	-----
COMMANDING [3]	P79X0511E	-----	ENA = 1, INH = 0						-----	-----
CMD DIRECTION [4]	P79X0512E	-----	MU = 1, DIO = 0						-----	-----
MU READY CH 1	P79X0513E	-----	YES = 1, NO = 0						-----	-----
MU READY CH 2	P79X0514E	-----	YES = 1, NO = 0						-----	-----

PARAMETER CHARACTERISTICS: SM 204 FGB DISPLAY (Cont)

CRT NAME	MSID	UNITS	DISPLAY RANGE	STATUS INDICATORS					FDA (Limits)	
				M	H	L	↑	↓	HI	LO
MU READY CH 3	P79X0515E	-----	YES = 1, NO = 0						-----	-----
OCS READY 1	P79X0518E	-----	YES = 1, NO = 0						-----	-----
OCS READY 2	P79X0519E	-----	YES = 1, NO = 0						-----	-----
BATT 1 VOLTS [5]	P79V0278A	VDC	0 --- 35					↓	N/A	25.5
BATT 1 CHG 1 [5]	P79E0246A	AMP-HRS	0 --- 60						N/A	N/A
BATT 1 CHG 2 [5]	P79E0248A	AMP-HRS	0 --- 60						N/A	N/A
BATT 2 VOLTS [5]	P79V0280A	VDC	0 --- 35					↓	N/A	25.5
BATT 2 CHG 1 [5]	P79E0250A	AMP-HRS	0 --- 60						N/A	N/A
BATT 2 CHG 2 [5]	P79E0252A	AMP-HRS	0 --- 60						N/A	N/A
BATT 3 VOLTS [5]	P79V0282A	VDC	0 --- 35					↓	N/A	25.5
BATT 3 CHG 1 [5]	P79E0254A	AMP-HRS	0 --- 60						N/A	N/A
BATT 3 CHG 2 [5]	P79E0256A	AMP-HRS	0 --- 60						N/A	N/A
BATT 4 VOLTS [5]	P79V0284A	VDC	0 --- 35					↓	N/A	25.5
BATT 4 CHG 1 [5]	P79E0258A	AMP-HRS	0 --- 60						N/A	N/A
BATT 4 CHG 2 [5]	P79E0260A	AMP-HRS	0 --- 60						N/A	N/A
BATT 5 VOLTS [5]	P79V0286A	VDC	0 --- 35					↓	N/A	25.5
BATT 5 CHG 1 [5]	P79E0262A	AMP-HRS	0 --- 60						N/A	N/A
BATT 5 CHG 2 [5]	P79E0264A	AMP-HRS	0 --- 60						N/A	N/A
BATT 6 VOLTS [5]	P79V0288A	VDC	0 --- 35					↓	N/A	25.5
BATT 6 CHG 1 [5]	P79E0266A	AMP-HRS	0 --- 60						N/A	N/A
BATT 6 CHG 2 [5]	P79E0268A	AMP-HRS	0 --- 60						N/A	N/A

## REMARKS

- [1] In the BC SYNC field, either 'YES' or 'NO' will be displayed to indicate whether or not the FGB MDM is communicating with the bus controller (either the OIU or Node MDM). When the FGB MDM loses sync with the bus controller, this field will read 'NO' and the crew will receive an alert light, tone and fault message.
- [2] By checking to see if the frame counter (FRM CTR) is incrementing, the crew can determine whether data is being received from the FGB MDM.
- [3] The COMMANDING field indicates whether or not the relay command matrix has been enabled (ENA) or inhibited (INH). The relay command matrix is controlled by the Mission Control Center in Moscow (**MCC-M**). When this command matrix is enabled, the Mission Control Center in Houston (**MCC-H**) or the crew can command the FGB. This field must read 'ENA' before either **MCC-H** or the crew has the capability to issue the RACU power ON and OFF commands.
- [4] The CDM DIR field indicates the direction of a command sent to a FGB element. This field will read either 'MU' to indicate that the command was originated from the Matching Unit or 'DIO' to indicate that the command was originated from the FGB MDM.
- [5] The BATT section displays the voltage and two charge readings for the six FGB batteries. The BATT CHG parameters measure the state of charge in Amp-hrs of the batteries. The range is 0 to 60 Amp-hrs, 0 being a completely drained battery and 60 being a fully charged battery. There are two sensors that measure the charge. The Russians are able to select and de-select the sensors depending on their telemetry needs. Therefore, both sets of battery charge data may not be available.

#### ITEM ENTRY CHARACTERISTICS: SM 204 FGB DISPLAY

- Items 1 --- 5: RACU 5 PWR VIA FGB ON/OFF - enables the crew to command RACU 5 power On/Off via the FGB MDM when the OIU is the bus controller. An asterisk will be displayed under the ON/OFF column.
- Items 3 --- 7: RACU 6 PWR VIA FGB ON/OFF - enables the crew to command RACU 6 power On/Off via the FGB MDM when the OIU is the bus controller. An asterisk will be displayed under the ON/OFF column.
- Items 2 --- 6: RACU 5 PWR VIA NCS ON/OFF - enables the crew to command RACU 5 power On/Off via Node MDM when the Node MDM is the bus controller. An asterisk will be displayed under the ON/OFF column.
- Items 4 --- 8: RACU 6 PWR VIA NCS ON/OFF - enables the crew to command RACU 6 power On/Off via Node MDM when the Node MDM is the bus controller. An asterisk will be displayed under the ON/OFF column.

SPEC 210 NODE 1 DISPLAY

1234567890123456789012345678901234567890123456789012345678901

	XXXX/210/XXX		NODE 1		XX X DDD/HH/MM/SS	
	PRI MDM	SEC MDM			DDD/HH/MM/SS	
1	PHY ID	XXXX	XXXX	CABIN PRESS	XX.XXS	
2	STATE	XXXX	XXXX			
3	STBY	1	2	BUS CONFIG		
4	N1-1	TO SEC	3	CH A CH B		
5	CONFIG	XXX	XXX	N1-1 MDM		
6				UB ORB N1-1	XX	19X
7	FRM CTR	XXX	XXX	CB GNC-1	XX	21X
8	SYNC		XXXS	LB LAB SYS-1	XX	23X
9						24X
10	TEMP	N1-1	XXXX	N1-2 MDM		
11		N1-2	XXXX	UB ORB N1-2	XX	25X
12	LOAD SHED			CB GNC-2	XX	27X
13	VIA NCS	4+	XXX	LB LAB SYS-2	XX	29X
14			XXXS			30X
15	POWER	ON	OFF	PRI MDM		
16	N1-1 MDM	7X	8X	UB EPS N1-14	XX	31X
17	SDO A	9X	10X		N1-23	XX
18	B	11X	12X			33X
19	N1-2 MDM	13X	14X	ISS C&W TONE STATUS		
20	SDO A	15X	16X	FIRE S		
21	B	17X	18X	WARN S CAUT S		
22						
23						
24						
25						

PARAMETER CHARACTERISTICS: SM 210 NODE 1 DISPLAY

CRT NAME	MSID	UNITS	DISPLAY RANGE	STATUS INDICATORS					FDA (Limits)	
				H	L	M	↑	↓	HI	LO
PHY ID PRI MDM	[1]	P79X0484E	-----	1 = N1-2, 0 = N1-1					-----	-----
PHY ID SEC MDM	[1]	P79X0486E	-----	1 = N1-2, 0 = N1-1					-----	-----
STATE PRI MDM BIT 5/6/7	[2]	P79X0120E/ P79X0487E/ P79X0488E	-----	STBY = 001 PRI = 010 SEC = 011 DIA = 111					-----	-----
STATE SEC MDM BIT 5/6/7	[2]	P79X0111E/ P79X0489E/ P79X0490E	-----	STBY = 001 PRI = 010 SEC = 011 DIA = 111					-----	-----
LOAD SHED VIA FGB	[6]	P79X0058E, P79X0068E, P79X0072E	-----	NO = 0, YES = 1				↓	N/A	1
CONFIG PRI MDM BIT 3-6	[3]	P79X0118E, P79X0500E → P79X0502E	-----	C01 --- C16					-----	-----
CONFIG SEC MDM BIT 3-6	[3]	P79X0109E, P79X0503E → P79X0505E	-----	C01 --- C16					-----	-----
FRM CTR PRI MDM	[4]	P79U0509D	-----	INCREMENT					-----	-----
FRM CTR SEC MDM	[4]	P79U0114D	-----	INCREMENT					-----	-----
SYNC - SEC MDM	[5]	P79X0112E	-----	1 = NO, 0 = YES				↓	N/A	1
TEMP N1-1		P79T0107D	°F	TBD					TBD	TBD
TEMP N1-2		P79T0106D	°F	TBD					TBD	TBD
N1-1 MDM POWER TRIP		P79X0453E	-----	-----				↓	N/A	1
N1-1 SDO A POWER TRIP		P79X0450E	-----	-----				↓	N/A	1
N1-1 SDO B POWER TRIP		P79X0451E	-----	-----				↓	N/A	1
N1-2 MDM POWER TRIP		P79X0300E	-----	-----				↓	N/A	1

PARAMETER CHARACTERISTICS: SM 210 NODE 1 DISPLAY (Cont)

CRT NAME	MSID	UNITS	DISPLAY RANGE	STATUS INDICATORS					FDA (Limits)	
				H	L	M	↑	↓	HI	LO
N1-2 SDO A POWER TRIP	P79X0298E	-----	-----					↓	N/A	1
N1-2 SDO B POWER TRIP	P79X0299E	-----	-----					↓	N/A	1
CABIN PRESS [7]	P79P0493A	PSIA	TBD				↑	↓	15	13.9
UB ORB N1-1 BUS CONFIG [8]	P79X0128E/ P79X0491E	-----	NA = 00 RT = 01 BC = 10						-----	-----
CB GNC-1 BUS CONFIG BIT 6/7 [8]	P79X0126E/ P79X0492E	-----	NA = 00 RT = 01 BC = 10						-----	-----
LB LAB SYS-1 BUS CONFIG BIT 6/7 [8]	P79X0124E/ P79X0494E	-----	NA = 00 RT = 01 BC = 10						-----	-----
UB ORB N1-2 BUS CONFIG BIT 6/7 [8]	P79X0134E/ P79X0495E	-----	NA = 00 RT = 01 BC = 10						-----	-----
CB GNC-2 BUS CONFIG BIT 6/7 [8]	P79X0132E/ P79X0496E	-----	NA = 00 RT = 01 BC = 10						-----	-----
LB LAB SYS-2 BUS CONFIG BIT 6/7 [8]	P79X0130E/ P79X0497E	-----	NA = 00 RT = 01 BC = 10						-----	-----
UB EPS N1-14 BUS CONFIG BIT 6/7 [8]	P79X0140E/ P79X0498E	-----	NA = 00 RT = 01 BC = 10						-----	-----
UB EPS N1-23 BUS CONFIG BIT 6/7 [8]	P79X0122E/ P79X0499E	-----	NA = 00 RT = 01 BC = 10						-----	-----
FIRE [9]	P79X0161E	-----	-----					↓	N/A	1
WARN [9]	P79X0158E	-----	-----					↓	N/A	1
CAUT [9]	P79X0157E	-----	-----					↓	N/A	1

## REMARKS

- [1] The PHY ID field will display 'N1-1' or 'N1-2' to indicate which ISS Node 1 Multiplexer/Demultiplexer (MDM) is the primary (PRI) and secondary (SEC) Node Control Software (NCS) MDM. For nominal operations, N1-2 will be the PRI MDM and N1-1 will be the SEC MDM.
- [2] The STATE field indicates the operational state of the primary and secondary MDMs. This field will read 'PRI' for primary, 'SEC' for secondary, 'STBY' for standby and 'DIA' for diagnostics.
- [3] The CONFIG field indicates the configuration number (C01 - C16) of the NCS running in the primary and secondary MDMs.
- [4] By checking to see if the frame counters (FRM CTR) for the PRI and SEC MDMs are incrementing, the crew can determine whether data is being received from the MDMs.
- [5] The SYNC field will display either 'YES' or 'NO' to indicate whether or not the SEC MDM is communicating with the PRI MDM. This field applies to the secondary MDM only. When the SEC MDM has lost sync with the PRI MDM, 'NO' will be displayed in the SYNC field and the crew will receive an alert light, tone, and fault message.
- [6] If any three or more FGB batteries read 25 volts or less, the FGB will send a C&W to the Node 1 MDMs, which will activate the load shed table. If this occurs, the LOAD SHED VIA FGB field will display 'YES' and a down-arrow will be displayed in the status field. The crew will also receive an alert light, tone, and fault message. Otherwise, the field will display 'NO'.
- [7] The CABIN PRESS field displays the Node 1 cabin pressure. When this parameter exceeds its lower/upper FDA limits, a down or an up arrow will be displayed in the status field. The crew will also receive a master alarm light and tone, a B/U C/W light on panel F7, and a fault message.
- [8] BUS CONFIG displays information on the ISS 1553B buses. The field to the right of the bus name displays the configuration of the buses connected to the specified MDM. This field will read either 'BC' for bus controller, 'RT' for remote terminal, or 'NA' for not available.
- [9] ISS C&W TONE STATUS: Since the Early Portable Computer System (PCS) doesn't have the capability to annunciate alarm tones, the tone status flag from the NCS will be used to trigger the Orbiter C&W system. When the tone status flag is set for any FIRE, WARNING, or CAUTION event, a down-arrow will be displayed in the appropriate status field. For a 'FIRE' event, the crew will receive a master alarm light and tone, a B/U C/W light on panel F7, and a fault message. For 'WARN' and 'CAUT' events, the crew will receive an alert light, tone, and fault message. The crew will then have to refer to the PCS for details on the fault condition.

## ITEM ENTRY CHARACTERISTICS: SM 210 NODE 1 DISPLAY

- Items 1 and 2: STBY - allows the crew to command either the primary or secondary MDM to the Standby state.
- Item 3: N1-1 TO SEC - commands N1-1 to the secondary state.
- Item 4: LOAD SHED VIA NCS - activates the Node 1 Load Shed Table, which will power off everything in the Node 1, except the MDMs. This command will be used by the crew in response to a fire in the Node. This command is protected to prevent inadvertent execution; therefore, an ITEM 4 + 99 entry is required. Currently, there is no telemetry from the NCS to indicate the status of the load shed. The load shed table can also be activated without crew or ground intervention.
- Items 7 --- 12: N1-1 POWER ON/OFF - allows the crew to close (Power On) and open (Power Off) the RPCs associated with the MDM power supplies and Solenoid Driver Output (SDO) A and B cards. An asterisk will be displayed next to the appropriate item number to indicate the power status. A down-arrow will be displayed in the Trip Status field when an RPC has tripped. The crew will also receive an alert light, tone, and fault message.
- Items 13 --- 18: N1-2 POWER ON/OFF - allows the crew to close (Power On) and open (Power Off) the RPCs associated with the MDM power supplies SDO A and B cards. An asterisk will be displayed next to the appropriate item number to indicate the power status. A down-arrow will be displayed in the Trip Status field when an RPC has tripped. The crew will also receive an alert light, tone, and fault message.
- Items 19 --- 34: BUS CONFIG CH A/CH B - allows the crew to select either Channel A or B on each of the buses. An asterisk will be displayed next to the appropriate item number to indicate the selected channel.
- Items 19 and 20: UB ORB N1-1 CH A/CH B - allows the crew to select which channel (A, B) the N1-1 MDM will communicate on the UB ORB N1-1 bus.
- Item 21 and 22: CB GNC-1 CH A/CH B - allows the crew to select which channel (A, B) the N1-1 MDM will communicate on the CB GNC-1 bus.
- Items 23 and 24: LB LAB SYS-1 CH A/CH B - allows the crew to select which channel (A, B) the N1-1 MDM will communicate on the LB LAB SYS-1 bus.
- Items 25 and 26: UB ORB N1-2 CH A/CH B - allows the crew to select which channel (A, B) the N1-2 MDM will communicate on the UB ORB N1-2 bus.
- Items 27 and 28: CB GNC-2 CH A/CH B - allows the crew to select which channel (A, B) the N1-2 MDM will communicate on the CB GNC-2 bus.
- Items 29 and 30: LB LAB SYS-2 CH A/CH B - allows the crew to select which channel (A, B) the N1-2 MDM will communicate on the LB LAB SYS-2 bus.

Items 31 and 32: UB EPS N1-14 CH A/CH B - allows the crew to select which channel (A, B) the PRI MDM will communicate on the UB EPS N1-14 bus.

Items 33 and 34: UB EPS N1-23 CH A/CH B - allows the crew to select which channel (A, B) the PRI MDM will communicate on the UB EPS N1-23 bus.

**SPEC 212 OIU DISPLAY**

123456789012345678901234567890123456789012345678901

1	XXXX/212/XXX	OIU	XX X DDD/HH:MM:SS
2			DDD/HH:MM:SS
3	OIU 1 TEMP +XXXXS	OIU STATUS CTR XX	
4	OIU 2 TEMP <u>XXXXS</u>	ISS BC TIME XX-XX-XX:XX:XX	
5			
6			
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26			

PARAMETER CHARACTERISTICS: SM 212 OIU DISPLAY

CRT NAME	MSID	UNITS	DISPLAY RANGE	STATUS INDICATORS				FDA (Limits)		
				H	L	M	↑	↓	HI	LO
OIU 1 TEMP [1]	P50T4000V	°F	-23.4 to +304.3			M	↑		212	-----
OIU 2 TEMP [1]	P50T4001V	°F	-23.4 to +304.3			M	↑		212	-----
OIU STATUS CTR	P50U4100D	SEC	00 --- 59						-----	-----
ISS BC TIME MM-DD-YY/HH:MM:SS [2]	P50U4110D	[2]	[2]						-----	-----
ACTIVE DEVICES PD 1 BITS 0-5 [3]	P50X4401E→P50X4406E	-----	OIU, CC1, CC2, SR1, SR2, MP1, MP2, N1-1, N1-2, FG1, FG2						-----	-----
ACTIVE DEVICES PD 2 BITS 0-5 [3]	P50X4411E→P50X4416E	-----	OIU, CC1, CC2, SR1, SR2, MP1, MP2, N1-1, N1-2, FG1, FG2						-----	-----
ACTIVE DEVICES PD 3 BITS 0-5 [3]	P50X4421E→P50X4426E	-----	OIU, CC1, CC2, SR1, SR2, MP1, MP2, N1-1, N1-2, FG1, FG2						-----	-----
ACTIVE DEVICES PD 4 BITS 0-5 [3]	P50X4431E→P50X4436E	-----	OIU, CC1, CC2, SR1, SR2, MP1, MP2, N1-1, N1-2, FG1, FG2						-----	-----
ACTIVE DEVICES BUS 1 [4]	P50U4055D	-----	0 --- 7 [4]						-----	-----
ACTIVE DEVICES BUS 2 [4]	P50U4065D	-----	0 --- 7 [4]						-----	-----
ACTIVE DEVICES BUS 3 [4]	P50U4075D	-----	0 --- 7 [4]						-----	-----
ACTIVE DEVICES BUS 4 [4]	P50U4085D	-----	0 --- 7 [4]						-----	-----
ACTIVE DEVICES LOCK 1 BITS 1, 2 [5]	P50X4440E, P50X4441E	-----	NONE = 00, YES = 01, NO = 10, N/A = 11						-----	-----

PARAMETER CHARACTERISTICS: SM 212 OIU DISPLAY (Cont)

CRT NAME	MSID	UNITS	DISPLAY RANGE	STATUS INDICATORS				FDA (Limits)		
				H	L	M	↑	↓	HI	LO
ACTIVE DEVICES LOCK 2 BITS 1, 2 [5]	P50X4450E, P50X4451E	-----	NONE = 00, YES = 01, NO = 10, N/A = 11						-----	-----
ACTIVE DEVICES LOCK 3 BITS 1, 2 [5]	P50X4460E, P50X4461E	-----	NONE = 00, YES = 01, NO = 10, N/A = 11						-----	-----
ACTIVE DEVICES LOCK 4 BITS 1, 2 [5]	P50X4470E, P50X4471E	-----	NONE = 00, YES = 01, NO = 10, N/A = 11						-----	-----
PDI DCM 1 (BIT, WORD, FRAME) SYNC	V75X6403D→ V75X6401D	-----	'*' = 1, blank = 0						-----	-----
PDI DCM 2 (BIT, WORD, FRAME) SYNC	V75X6407D→ V75X6405D	-----	'*' = 1, blank = 0						-----	-----
PDI DCM 3 (BIT, WORD, FRAME) SYNC	V75X6411D→ V75X6409D	-----	'*' = 1, blank = 0						-----	-----
PDI DCM 4 (BIT, WORD, FRAME) SYNC	V75X6415D→ V75X6413D	-----	'*' = 1, blank = 0						-----	-----
OIU CMD CTR [6]	P50U4130D	-----	000 --- 255						-----	-----
OIU PSP I/F [7]	P50X4283E	-----	OK, ERR						-----	-----
FLOAT POINT [8]	P50X4288E	-----	OK, ERR						-----	-----
PSP LAST CMD	V92X1102X, V92X1116X, V92X1129X	-----	OK, REJ, INC						-----	-----
OIU LAST CMD	P50X4281E, P50X4303E	-----	OK, REJ						-----	-----
SSOR PRI FRM SYNC	V74X2050E	-----	YES, NO			M			-----	-----
SSOR PRI STATUS	V74X2051E	-----	OK, BAD			M			-----	-----
SSOR B/U FRM SYNC	V74X2053E	-----	YES, NO			M			-----	-----
SSOR B/U STATUS	V74X2052E	-----	OK, BAD			M			-----	-----

## REMARKS

- [1] These parameters will read 140 °F when the OIU associated with that measurement is OFF. Note that the only sure method to determine which OIU is powered up from this display alone (without referring to the OIU SSP power talkback) is to look for the ‘OFF’ temperature noted above. An up arrow will be displayed when the temperature FDA limit is reached, and an ‘M’ will be displayed when the associated data is missing.
- [2] The ISS BC Time follows the format MM-DD-YY/HH:MM:SS. The OIU Status Counter displays the OIU Time parameter for seconds, reading from 00 to 59 and resetting to 00 again. This display item is intended to indicate OIU health by constantly counting from 00 to 59 and recycling when the OIU telemetry is being processed by the PDI. The ISS BC time comes from whichever device is BC to the OIU on one of its MS 1553B busses. This parameter will read all zeroes at power-up, will show the correct BC time at the time the BC comes up and starts sending telemetry to the OIU, and will remain static at the last good sample when the incoming MS 1553B telemetry from that BC goes away.
- [3] PD: OIU (default when no active device assigned, also displayed when in a format which supports an OIU Error Log Dump)  
CC1 (CC2) ISS Command and Control MDM #1 or #2  
SR1 (SR2) Space to Space Orbiter Radio (SSOR) #1 or #2  
MP1 (MP2) ISS Mini Pressurized Logistics Module (MPLM) MDM #1 or #2  
N1-1 (N1-2) ISS Node 1 MDM #1 or #2  
FG1 (FG2) ISS FGB MDM #1 or #2
- [4] BUS: OIU MS 1553B Bus #1 to #7, with #8 reading ‘0’.  
(Note-Current OIU hardware only supports Busses #1 to #4)
- [5] NONE if the current OIU Format does not have an AD for this display location  
YES if the OIU is RT and in sync with the AD (AD is an ISS BC or SSOR)  
YES if the AD is OIU in error log dump format (OIU must be in sync with itself)  
NO if the OIU is RT and was in sync with the AD but has lost lock on the AD (ISS BC or SSOR)  
N/A if the OIU is BC to the AD, except if the AD is SSOR

Note that if LOCK goes from ‘YES’ to ‘NO’, the OIU stops attempting to acquire sync with that AD. To force the OIU to attempt to resync with an AD (ISS BC through MS 1553 bus direct or through the SSOR), the appropriate OIU Format must be reloaded, thus forcing a resync attempt.
- [6] The OIU Command Counter will start at “000” at power-up, and will increment by one whenever the OIU receives a valid command from the PSP. The counter reads in decimal, and will count from ‘000’ to ‘255’ and roll over to ‘000’. All commands, whether from the MCC or the MCDS will cause the counter to increment if received and processed by the OIU.
- [7] The PSP I/F (Interface) parameter indicates whether the OIU is receiving the 16 KHz command carrier from either PSP #1 or #2. This parameter will read as follows:  
‘OK’ if the OIU is receiving the PSP command carrier  
‘ERR’ if the OIU is not receiving the PSP command carrier.

- [8] The OIU can convert one ISS floating point parameter value per PDI minor frame (maximum of 100 per major frame) into a Shuttle PDI-compatible parameter value. If an ISS floating point value is invalid, or results in an invalid floating point value/operation during the conversion process, the OIU announces an error. The associated display parameter will read as follows:

‘OK’ if no floating point error

‘ERR’ if an invalid floating point value/operation is detected.

## ITEM ENTRY CHARACTERISTICS: SM 212 OIU DISPLAY

- Item 1: FORMAT - This is an indexed command item entry, with OIU actual telemetry status. This item allows changing the OIU's PDI format (ITEM 1 + XXX EXEC). The range of allowable format numbers is 001 to 255, in decimal format. The status feedback is the currently loaded OIU PDI format.
- Item 2 --- 5: BUS 1 RT (BC, A, B) - This section allows changing the OIU's current MS 1553 B bus processing state (Bus Controller or Remote Terminal) and prime bus channel (A or B) for any of the currently implemented four OIU MS 1553 B busses. The status feedback is the actual OIU state for each bus and parameter, with an asterisk displayed to indicate the currently selected state. For example, if Bus 3 is BC, and using Channel A, there will be an asterisk next to Items 11 and 12. To change Bus 3 to RT, an 'ITEM 10 EXEC' is performed. In the case of the bus channelization ('A' or 'B'), the displayed telemetry indicates which channel is prime for command and telemetry transactions on that bus if the OIU is BC on that bus. If the OIU is BC on a bus, it will try to send a command for an active device associated with that bus using the prime channel. If the OIU receives no MS1553B status message from that active device, it tries again on the prime channel, then it tries on the alternate channel, and if the active device has not responded, it declares it failed and stops trying to send that command to that active device. When the OIU is RT on a bus, it will respond on either channel, depending on which channel received a MS1553B transaction from the BC; therefore, the channel priority has no meaning when the OIU is RT on a bus.
- Items 6 --- 9: BUS 2 RT (BC, A, B) - Same as BUS 1 RT (BC, A, B)
- Items 10 --- 13: BUS 3 RT (BC, A, B) - Same as BUS 1 RT (BC, A, B)
- Items 14 --- 17: BUS 4 RT (BC, A, B) - Same as BUS 1 RT (BC, A, B)
- Item 18: This item entry has command entry feedback only, no actual OIU feedback. This item entry is an indexed command which allows performing the following internal OIU function mapping:
- Item 18 + 1: Change FGB MDM Active Device to FGB-2 MDM Physical Device
  - Item 18 + 2: Change FGB MDM Active Device to FGB-1 MDM Physical Device
  - Item 18 + 3: Change Node 1 MDM Active Device to N1-2 MDM Physical Device
  - Item 18 + 4: Change Node 1 MDM Active Device to N1-1 MDM Physical Device
  - Item 18 + 5: Move FGB -2 MDM Physical Device to OIU Bus # 4 (UB ORB N1-2)
  - Item 18 + 6: Move FGB -2 MDM Physical Device to OIU Bus # 3 (UB ORB N1-1)
  - Item 18 + 7: Move FGB -1 MDM Physical Device to OIU Bus # 4 (UB ORB N1-2)
  - Item 18 + 8: Move FGB -1 MDM Physical Device to OIU Bus # 3 (UB ORB N1-1)